

**THE ESTIMATED EFFECTS OF FOUR  
PROPOSED SHOPPING CENTERS ON  
METROPOLITAN LAFAYETTE**

**JULY, 1957**

**NO. 25**

**Joint  
Highway  
Research  
Project**

**PURDUE UNIVERSITY  
LAFAYETTE INDIANA**

by  
**MART KASK**



## Final Report

### THE ESTIMATED EFFECTS OF FOUR PROPOSED SHOPPING CENTERS ON METROPOLITAN LAFAYETTE

TO: K. B. Woods, Director  
Joint Highway Research Project

July 24, 1957

FROM: H. L. Michael, Assistant Director

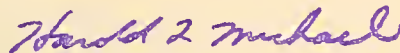
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Project C-36-54Y

Attached is a final report entitled "The Estimated Effects of Four Proposed Shopping Centers on Metropolitan Lafayette" by Mart Kask, Graduate Assistant on our staff. The study was approved by the Board on January 24, 1957 and was performed under the direction of Professor H. L. Michael. It was also used by Mr. Kask as his thesis in partial fulfillment of the requirements for the degree of Master of Science.

This report includes an economic appraisal of the Metropolitan Lafayette area and an evaluation of the effect of the proposed shopping centers on traffic, economic conditions, tax rates, and land use. Since all of the proposed shopping centers are located adjacent to State Highways the traffic findings and recommendations should be of immediate value to the State Highway Department. The report will also be of interest and value to Lafayette officials and citizens.

The report is presented for the record.

Respectfully submitted,



Harold L. Michael, Assistant Director

HLM:bjk

#### Attachment

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FINAL REPORT

THE ESTIMATED EFFECTS OF FOUR PROPOSED SHOPPING  
CENTERS ON METROPOLITAN LAFAYETTE

Prepared by  
Mart Kask  
Graduate Assistant

Joint Highway Research Project  
Project: C-36-54Y  
File: 3-3-25

Purdue University  
Lafayette, Indiana

July 24, 1957





## ACKNOWLEDGMENTS

The author wishes to express his sincere appreciation to Professor Harold L. Michael, Assistant Director of the Joint Highway Research Project and Assistant Professor of Highway Engineering, Purdue University, for the generous time and effort expended in the guidance of this investigation.

The writer is grateful to the Joint Highway Research Project, Purdue University, for providing the opportunity to perform the study.

Special thanks are extended to Mr. Russell M. Brown in charge of Metropolitan Area Traffic Survey Unit of the State Highway Department of Indiana for his willing assistance during the study.

The author also wishes to thank the many personnel of the cooperating agencies, the Caroline D. Realty Corporation; the Lux Real Estate Agency; the Lafayette Chamber of Commerce; and the Lafayette Journal and Courier.

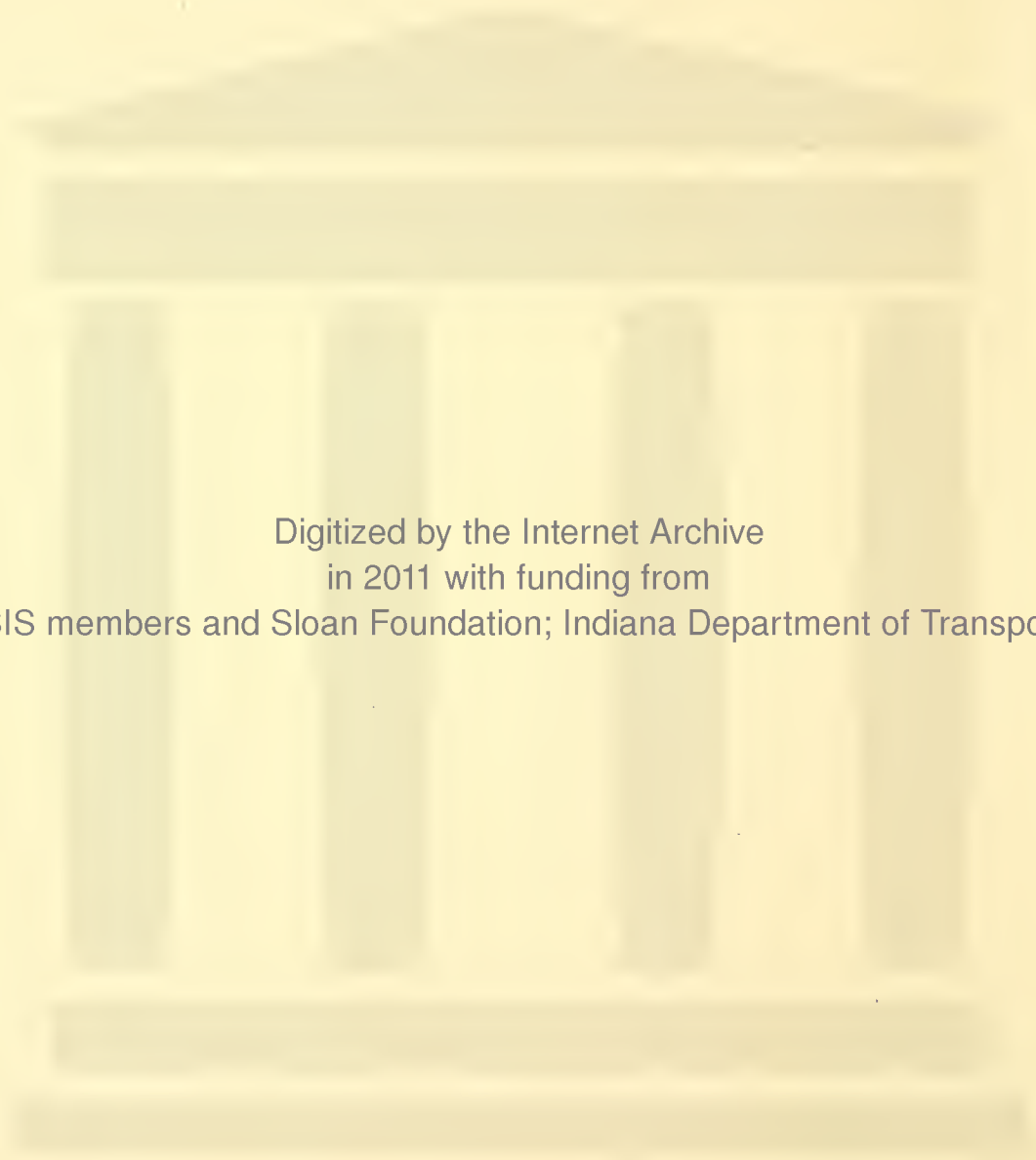
The author is also indebted to the several men and women who assisted in the analysis and typing of the information.





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## ABSTRACT

The primary purpose of this study was to determine the effects of four proposed shopping centers on Metropolitan Lafayette.

In the study an economic analysis was made to determine whether Metropolitan Lafayette will be able to support all the shopping center developments presently planned for the future. This involved: an appraisal of Lafayette's economic base and its future; the determination of Lafayette's trade area by the application of the law of retail gravitation; an estimation of present population and the anticipated future growth; and a study of incomes of residents and their retail expenditures in the trade area. A thorough review of literature in the shopping center field provided a guide for the procedure followed in the economic analysis.

Having determined that only three of the four proposed shopping centers would have great enough potential to warrant construction within the immediate future the generated shopper traffic in the trade areas was then assigned to the roadnet leading to the three proposed shopping centers.

The existing traffic flow in the vicinity of the proposed shopping centers was determined from automatic traffic recording counts while traffic volumes for the year of 1963 were estimated based on present traffic volumes and anticipated future developments.

The estimated 1963 pre-Christmas peak hour traffic flow in the vicinity of the three proposed shopping centers consisting of shopper





traffic and non-shopper traffic served to indicate the locations where major traffic congestion attributable to shopper traffic would occur.

Finally, other effects of the proposed shopping centers on Metropolitan Lafayette were estimated, and it was found that the three proposed shopping centers would have no consequential adverse effects on the Metropolitan Lafayette Area.



THE ESTIMATED EFFECTS OF FOUR PROPOSED SHOPPING CENTERS  
ON METROPOLITAN LAFAYETTE

INTRODUCTION

The outlying shopping center has come into prominence principally since 1945. A moderate number have been built and many more are being considered.

A study to determine their potential feasibility as business enterprises and their effects upon the economy in their locality is a necessary step prior to construction.

The outlying shopping center is almost wholly dependent upon auto-borne trade and the extent to which traffic facilities are provided can be the difference between a marginal or a successful operation.

Since smooth traffic flow and adequate parking facilities are two of the primary reasons for the shopping center's existence, highway congestion cannot be accepted as inevitable. Public road congestion with its consequent reduction in business volume can make the shopping center a poor investment and, as such, it either will not be built or, if built, it will deteriorate and all of its many advantages to the community will be sacrificed in favor of the marginal strip developments which now harass the motorist on nearly every main street in nearly every suburb.

Public funds and public authority are mandatory for highway improvements. Even though the municipality may be well aware that the tax returns from the shopping center itself and its influences on surrounding land values will pay for the highway improvements, they are not able to build them



until tax money is paid. And, unfortunately, the shopping center must have the improvements before it can operate efficiently or even maintain itself.

Public and highway officials cannot accept traffic congestion. They are, by the positions they hold, bound to solve all traffic problems within their capabilities and to the extent of the funds made available to them. Their desire to cooperate has been evidenced in every project undertaken by private or governmental agencies, but their efforts during the planning stage have been hampered by: (1) the lack of funds which can be spent to alleviate traffic congestion which is not yet in evidence, and (2) the lack of statistical data on which to base an analysis.

The traffic problems created by a shopping center are new. This traffic is highly specialized in nature and cannot be compared with downtown situations where there is a blend of shopping, business and commuter traffic aided, in most cases, by an integrated public transit system.

Since a shopping center does not have a slow evolutionary growth but, instead, emerges full blown on opening day, its problems cannot be solved by periodic traffic counts from which future growth and highway needs can be projected. A delayed improvement program makes necessary land acquisition doubly difficult and expensive, temporarily increases the congestion and seriously hampers the center's operation. An extended limitation on the center's operation can have the effect of a reduced evaluation with a subsequent reduction in tax returns. If a realistic program of road improvement can be evolved and put into effect during the planning stage of the shopping center so that the sudden revision in the existing traffic pattern is balanced with the facilities provided, the shopping center can then assume its important role in the community.





## THE ECONOMIC ANALYSIS

### Economic Base of Metropolitan Lafayette

Metropolitan Lafayette, consisting of the cities of Lafayette and West Lafayette and surrounding territory, is regarded as the agricultural, educational, industrial, and cultural center of Northwestern Indiana.

The community is located 60 miles northwest of Indianapolis and 125 miles southeast of Chicago. It is within a hundred miles of that part of southwestern Indiana that has been regarded as the center and "heart" of the nation's population for more than 55 years.

Located in a temperature zone which is subject neither to extremely hot nor severely cold weather, Metropolitan Lafayette has a number of natural advantages which combine to make the city a healthful place in which to live. The average temperature for the year is 51.7 degrees with the monthly averages varying from 26.5 degrees in January to 75.6 degrees in July. The average annual precipitation is 38.26 inches (1)\*.

The community's geographical position has important industrial and commercial advantages because of direct access to sources of raw material and proximity to major markets for finished goods, plus good shipping transportation in and out. These transportation facilities include several large trucking lines, four major railroads, one scheduled airline with available charter service at three airports, and the city lies on several major arterial highways. U. S. Highway 52 passes through

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\* Numbers in parenthesis refer to bibliography.



Lafayette as do State Roads 25, 26, 38, and 43. The principal river, the Wabash, provides excellent water and a drainage source for manufacturing. Fifty other diversified industries are located in the community. Figure 1 shows the vicinity of Lafayette - West Lafayette.

Purdue University located in West Lafayette across the Wabash River from Lafayette is the Indiana link in a nationwide chain of 69 land grant colleges and universities. Today Purdue enrolls more than 13,000 undergraduate and graduate students on its Lafayette campus. Her 4,200 staff members teach and conduct research in sixty principal buildings on the 7,000 acres controlled by the institution (2).

Metropolitan Lafayette has a population of about 65,000 people. Forty-six million people reside within a radius of 400 miles of this community in one of the richest agricultural and industrial regions of the United States. Within this radius lies one-sixth of the nation's farming wealth and 40 per cent of the nation's industrial strength (3).

Numerous major metropolitan areas are reasonably close. Indianapolis is southeast 60 miles. Chicago is 125 miles northwest. St. Louis is 254 miles southwest. Detroit is 272 miles northeast. Cincinnati is 159 miles southeast. And Columbus is 228 miles east.

Metropolitan Lafayette is not dependent on any single industry or group of related industries but rather draws its industrial and economic strength from more than 25 diversified manufacturing plants.

Industries in the community include the world's largest manufacturer of prefabricated homes; one of the world's largest aluminum extrusion plants; a principal supplier of rubber insulating materials; one of the country's principal safe makers; and manufacturers of electric meters and parts for electric appliances, automotive gears and parts, automotive



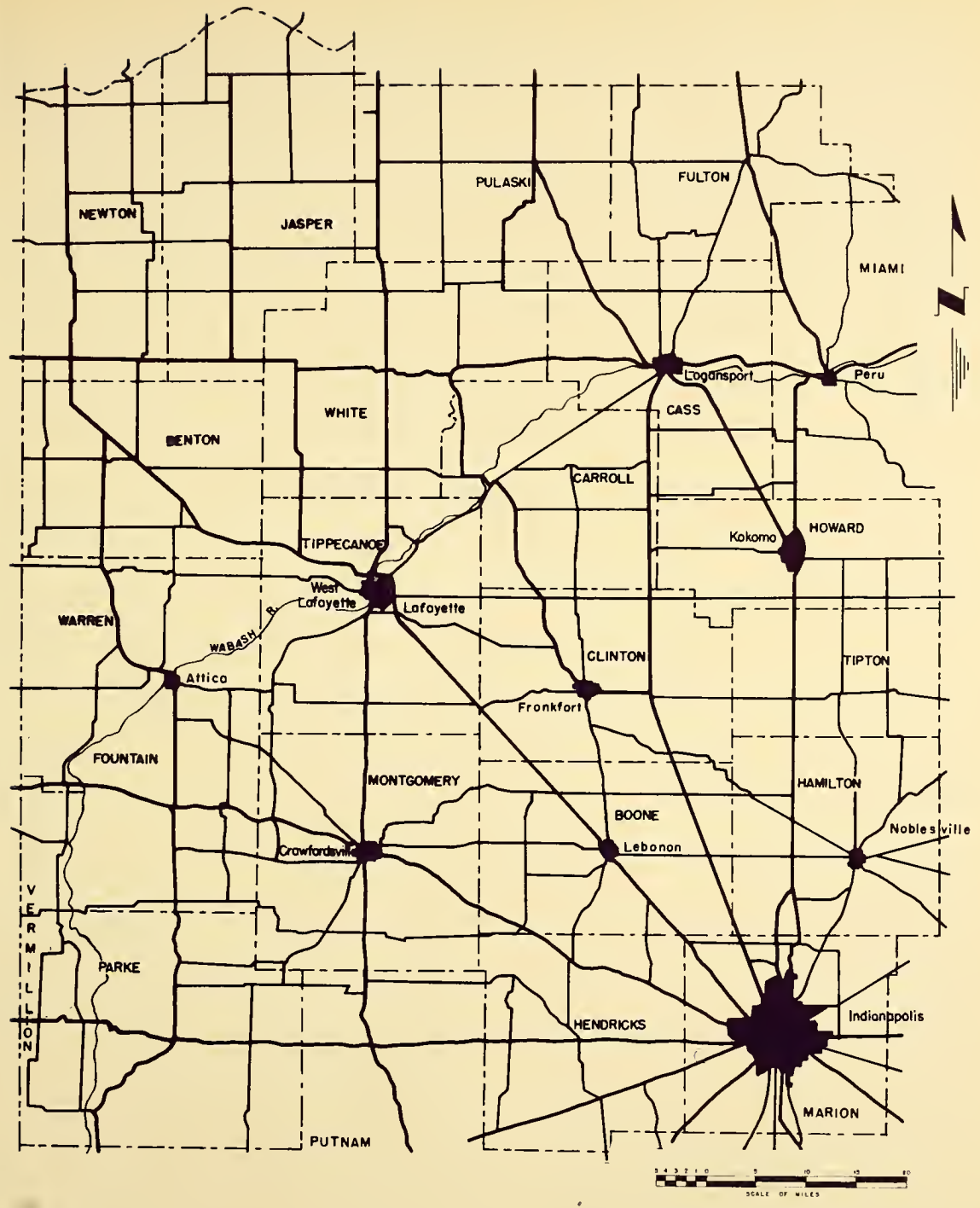


FIGURE 1 LAFAYETTE-WEST LAFAYETTE  
AND VICINITY





power steering apparatus, heating equipment, refrigerator shelves and wire containers, paper and cardboard products, pharmaceuticals and antibiotics, and building materials.

Lafayette has proven to be a location for stable new industries. Within the past few years, the Tippecanoe Laboratories antibiotic plant of Eli Lilly and Company and the Egyptian Lacquer Company have established manufacturing plants in Lafayette. Rea Magnet Wire Company is in the process of constructing a new plant in Lafayette. Previous to the establishment of the plants mentioned above the Aluminum Company of America and the National Homes Corporation have been developed by local ingenuity. The Fairfield Manufacturing Company, the Duncan Electric Manufacturing Company, and the Rostone Corporation, have built new million-dollar plants replacing older structures here in the last three years.

A community Planning Committee Report on industrial expansion by Professor E. T. Weiler, Department of Economics, Purdue University, predicted that a well balanced industrial development program for Tippecanoe County for the next 20 years may be estimated at 2,700 acres excluding the expansion of railroads, highways, airport facilities, and industrial expansion taking place in the area already owned by existing industry (4). From this report the following industrial development acreage was taken:

Industry in present use	1,200 acres
1965, additional expansion	1,000 acres
1975, additional expansion	1,700 acres
Total	<hr/> 3,900 acres

The Purdue University construction program now under way totals more than \$40,000,000.



Today the combined cities of Lafayette and West Lafayette present a picture of a community recognized as a good place to live and work.

### Urban Decentralization

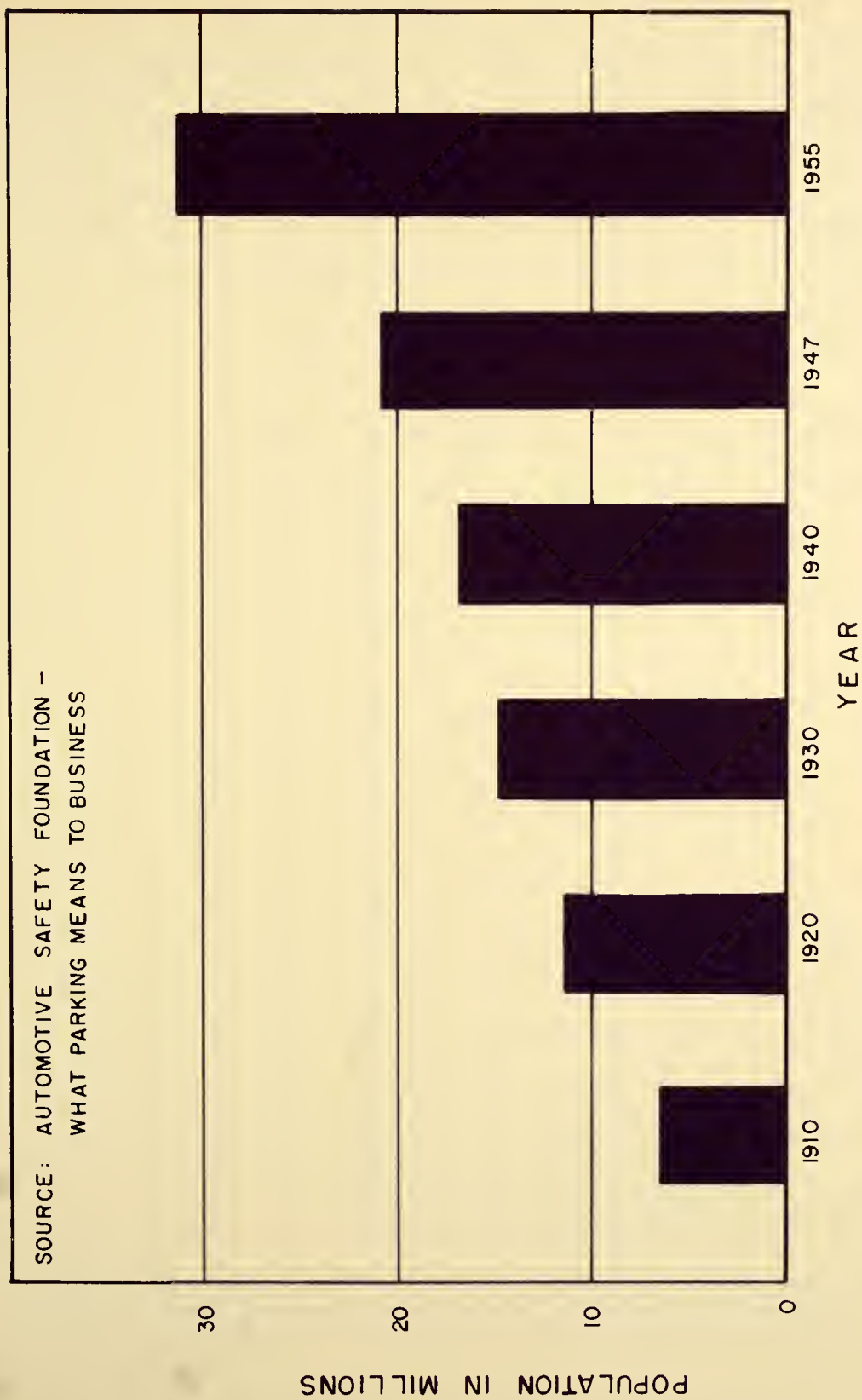
The concentration of buying in central business districts of our largest American cities developed as a result of mass transportation. Within the last few years families have been moving beyond or in between the mass transportation network, and automobile ownership has become universal. Figure 2 shows that since 1910 the population of suburban areas has increased about 400 percent. This is compared with only 80 percent for the nation as a whole. Currently the suburbs are growing three to four times faster than their parent cities (5).

It has become increasingly difficult to reach central areas from suburban homesites by public transportation, and more convenient to drive the private automobiles to outlying shopping centers. In smaller cities like Lafayette and West Lafayette where families have been accustomed to coming downtown in their own automobiles, traffic on Main Street has become extremely congested. Nearly everyone still tries to drive to the central business district and to find a parking space.

### Increasing Traffic

The increasing traffic congestion in the central districts of practically every American city including Lafayette can only be ameliorated slightly by all the efforts made to solve it. Even with the best solutions, increased car ownership will either force many people to abandon the attempt to drive into central areas or will create intolerable traffic congestion. In Lafayette where 17,350 automobiles per average day (6) desire to park in the central business district and where there exist





**FIGURE 2                      GROWTH OF THE SUBURBS**



700 spaces along the curb, traffic on State Highways is slowed to 11 miles per hour by congestion during the afternoon rush hour. Figure 3 shows the passenger car travel time contours during the afternoon rush hour while Figure 4 shows the passenger car travel time contours averaged for daylight hours. The contours are time increments from an arbitrary point--intersection of State Street--River Road--Brown Street. The contours have a greater distance between them in West Lafayette than in Lafayette. In the central business district of Lafayette, the contour spacing is the smallest.

Data on driving time in Metropolitan Lafayette was obtained by using Streeter-Amet Travel Time and Distance Recorder on field observations conducted in January 1957. However, most of the data were obtained from the Metropolitan Area Traffic Survey Unit of the State Highway Department of Indiana.

Traffic volumes for an average week-day for the survey period, September 28 to December 6, 1952<sup>\*</sup>, based on the 24 hour automatic counts, are graphically shown on Figure 5 for the existing state and city thoroughfares in Lafayette--West Lafayette (7).

Figure 6 shows the predicted 1952 average weekday survey period traffic volumes on existing and proposed state and city thoroughfares. A factor of 0.88 must be applied to all volumes to obtain the average daily traffic volumes for the entire year of 1952. For a number of years traffic on city streets in Lafayette has increased at a rate of 4 percent per year. In order to be able to estimate future travel on the state

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\* A comprehensive traffic survey was conducted in Lafayette--West Lafayette by the Metropolitan Area Traffic Survey Unit of the State Highway Department of Indiana between September 9, 1952 and May 1, 1953.





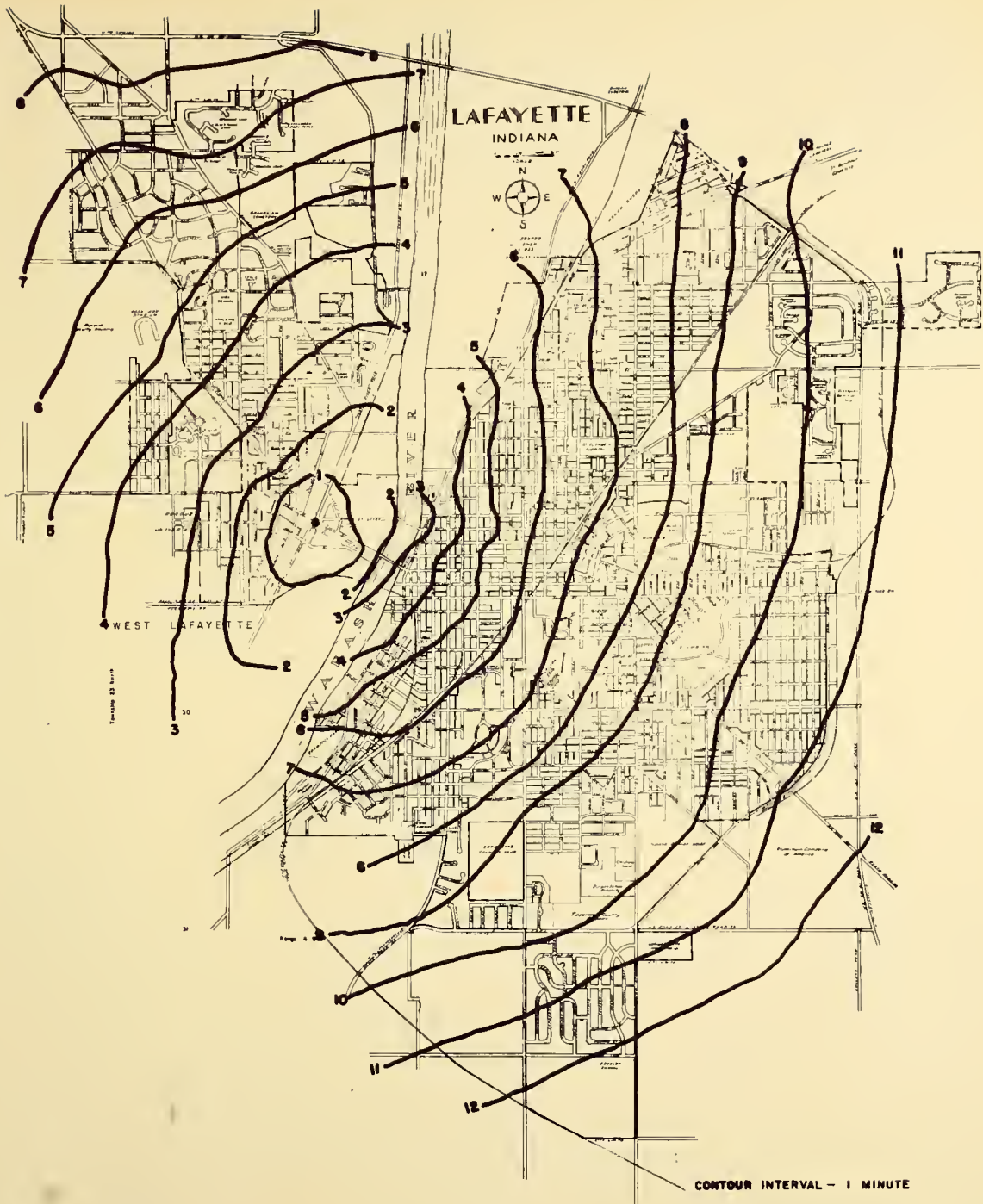


FIGURE 3 PASSENGER CAR TRAVEL TIME CONTOURS  
4:30 TO 5:30 P.M. - 1957



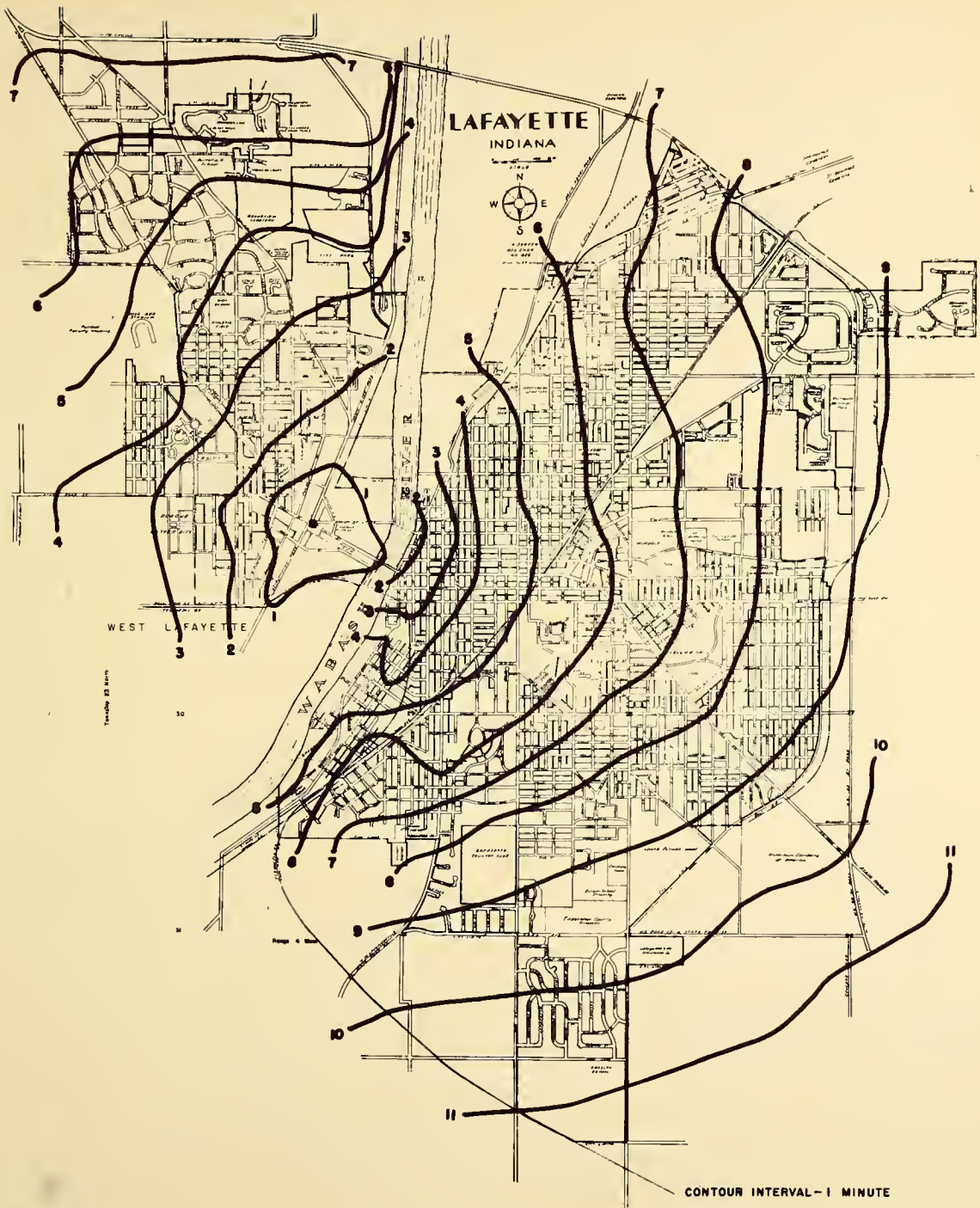
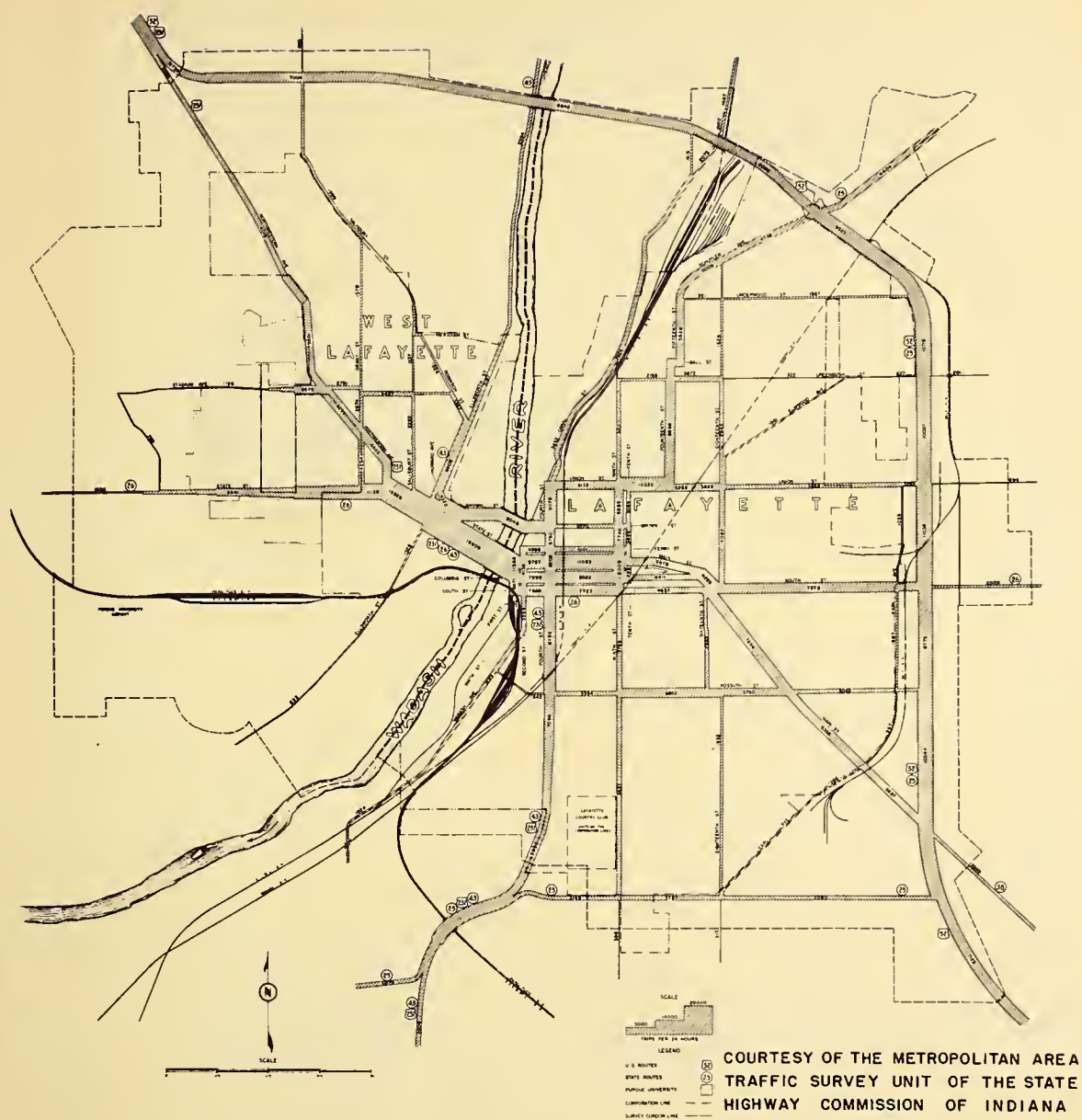


FIGURE 4 PASSENGER CAR TRAVEL TIME CONTOURS-1957



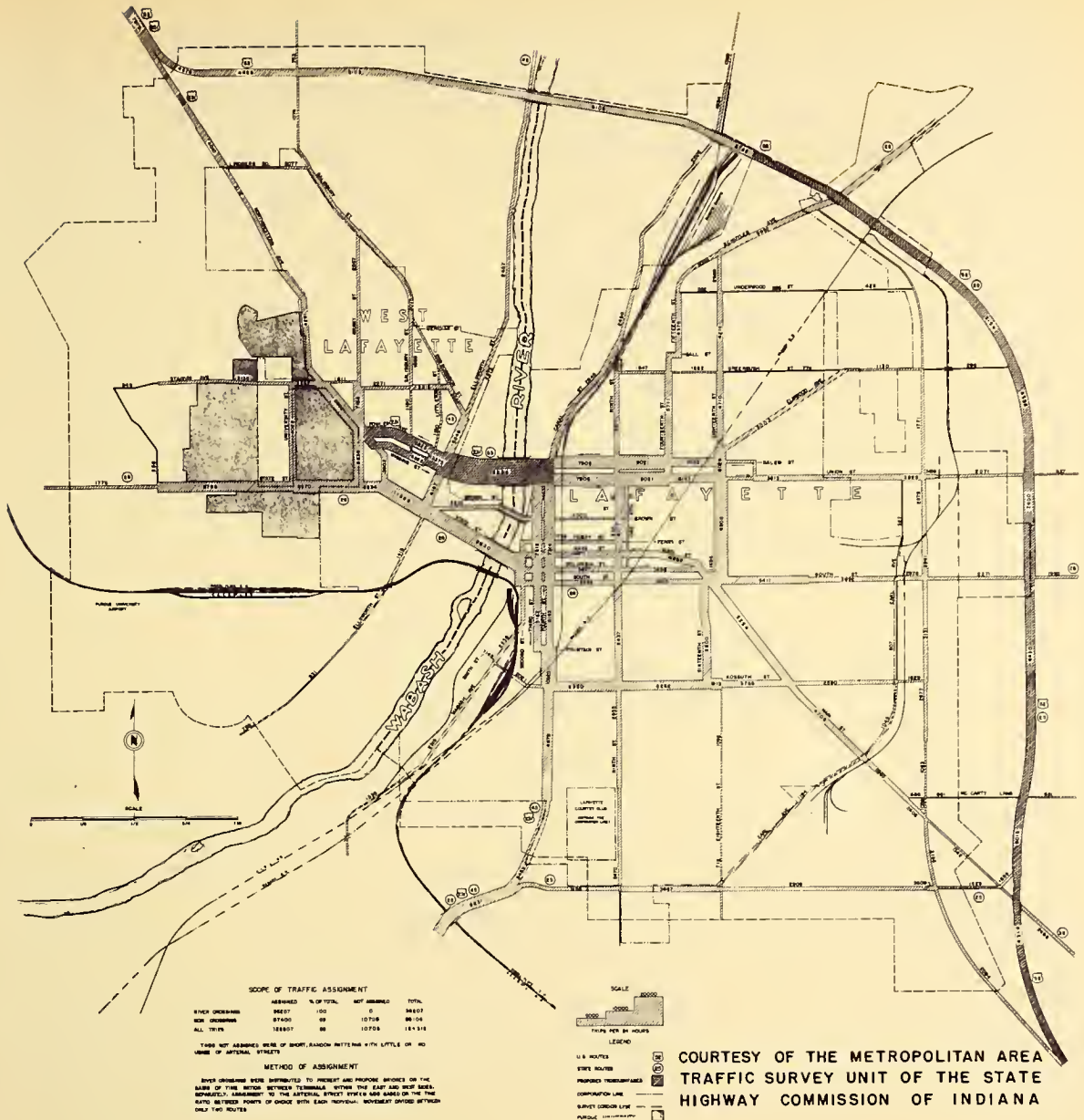


NOTE: AVERAGE WEEKDAY SURVEY PERIOD SEPTEMBER 28 TO DECEMBER 6, 1952

FIGURE 5 TRAFFIC VOLUMES ON EXISTING STATE AND CITY THOROUGHFARES







NOTE: AVERAGE WEEKDAY SURVEY PERIOD SEPTEMBER 28 TO DECEMBER 6, 1952

**FIGURE 6 PREDICTED TRAFFIC VOLUMES ON EXISTING AND PROPOSED STATE AND CITY THOROUGHFARES**





and city thoroughfares in Metropolitan Lafayette from these 1952 volumes, with or without new street construction, a factor produced by an increase of 4 percent per year since 1952 should be applied. It has been noted that traffic volumes on U. S. Highway 52 Bypass have increased at a rate of 5 percent per year.

From the above discussion, one thing is evident: a major cause of traffic congestion in the central business district of Lafayette is caused by a lack of adequate parking space. The long-festering parking problem is not going to get itself conveniently lost in the process of community rehabilitation and circulatory improvements. Without specific and positive action, it is bound to get worse.

#### Locations of Shopping Centers

Traffic congestion, urban decentralization, and universal car ownership have made it necessary to divert from the central business district and develop new types of retailing centers for the residents in the rapidly growing suburban areas. The need for major shopping centers constructed on the rim of Lafayette's urban area where there is three to four times as much parking area as store area, has been at least partially created by the increasing traffic congestion in the central business district.

At the present time three neighborhood shopping centers and one community shopping center are being planned in the Greater Lafayette Area. Figure 7 shows the locations of the four proposed shopping centers.

The site for the Wabash Village Shopping Center is located south along U. S. Highway 52 Bypass from County Farm Road to Happy Hollow Road north of the City of West Lafayette. This development is planned as a



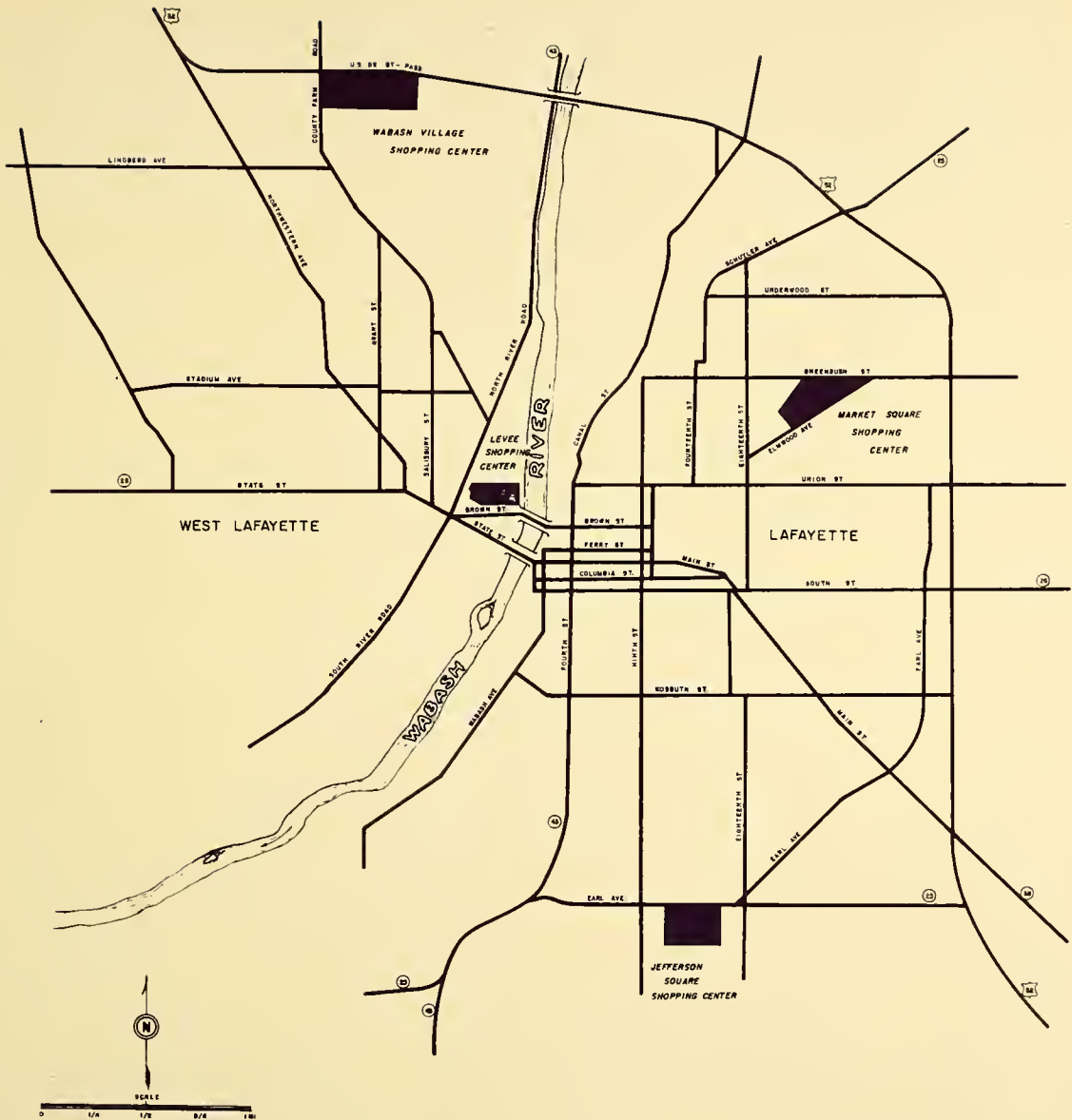


FIGURE 7 LOCATIONS OF PROPOSED  
SHOPPING CENTERS  
IN LAFAYETTE - WEST LAFAYETTE



large neighborhood shopping center of 84,000 square feet of rentable area in the first stage and 113,000 square feet in the total development.

The site for the Levee Shopping Center is located on a 20 acre site just north of the Brown Street Levee in West Lafayette. This development is planned as a neighborhood shopping center of 150,000 square feet of floor space area. No date has been set for construction.

The site for the Market Square Shopping Center is located in an area bounded by Elmwood Avenue and Greenbush Street in northeast Lafayette. This development is planned as a community shopping center with a department store. There will be a total of 162,000 square feet of shopping area of which the department store will occupy the largest single space of 52,000 square feet.

The site for the Jefferson Square Shopping Center is located south of Earl Avenue across from the Tippecanoe County Fair Grounds in the southern portion of Lafayette. This development is being planned as a neighborhood shopping center with a large grocery store as the major tenant. There will be a total of 43,438 square feet of rentable area with provisions for future expansion.

#### The Trade Area

As the name implies, the trade area is the area from which each shopping center can expect some degree of trade. This area then is divided into primary and secondary zones--the primary area is the close-in zone within which the center can expect to attract buyers for shopping and convenience goods while the secondary area is more remote and its patronage will be in the shopping goods (apparel, furniture, general department store and other lines customarily bought farther from home).



The primary trade area for Lafayette was estimated as the area within 40 minutes driving time from the central business district of Lafayette. At places where it takes less than 40 minutes to drive to a nearby town an equilibrium point was established between the town and Lafayette. The boundary of the primary trade area was then established through these points or along a 40 minute driving-time contour. The primary trade area for Lafayette is shown on Figure 8 (shaded portion) along with driving time contours originating from the central business district of Lafayette.

The total trade area tributary to Metropolitan Lafayette from which expenditures might be made for the apparel, furniture, and general department store lines was determined by the application of the law of retail gravitation. The law of retail gravitation used by market analysts to estimate sales at proposed shopping centers has gained increased acceptance in the last few years.

In 1929 William J. Reilly formulated the law of retail gravitation which bears his name (8). The law states that two towns share the retail purchases of an intermediate place in direct proportion to the population of the towns and inversely with the squares of the distances between the towns and the intermediate place. This is formulated as:

$$\frac{S_1}{S_2} = \frac{P_1}{P_2} \frac{D_2^2}{D_1^2}$$

where  $S_1$  and  $S_2$  are the sales made by the two towns to the residents of the intermediate place,  $P_1$  and  $P_2$  the population of the towns, and  $D_1$  and  $D_2$  the distances from the towns to the intermediate place.

More recent developments in the use of the retail gravitation





DRIVING TIME CONTOURS IN MINUTES  
ORIGINATING FROM THE CENTRAL  
BUSINESS DISTRICT OF LAFAYETTE

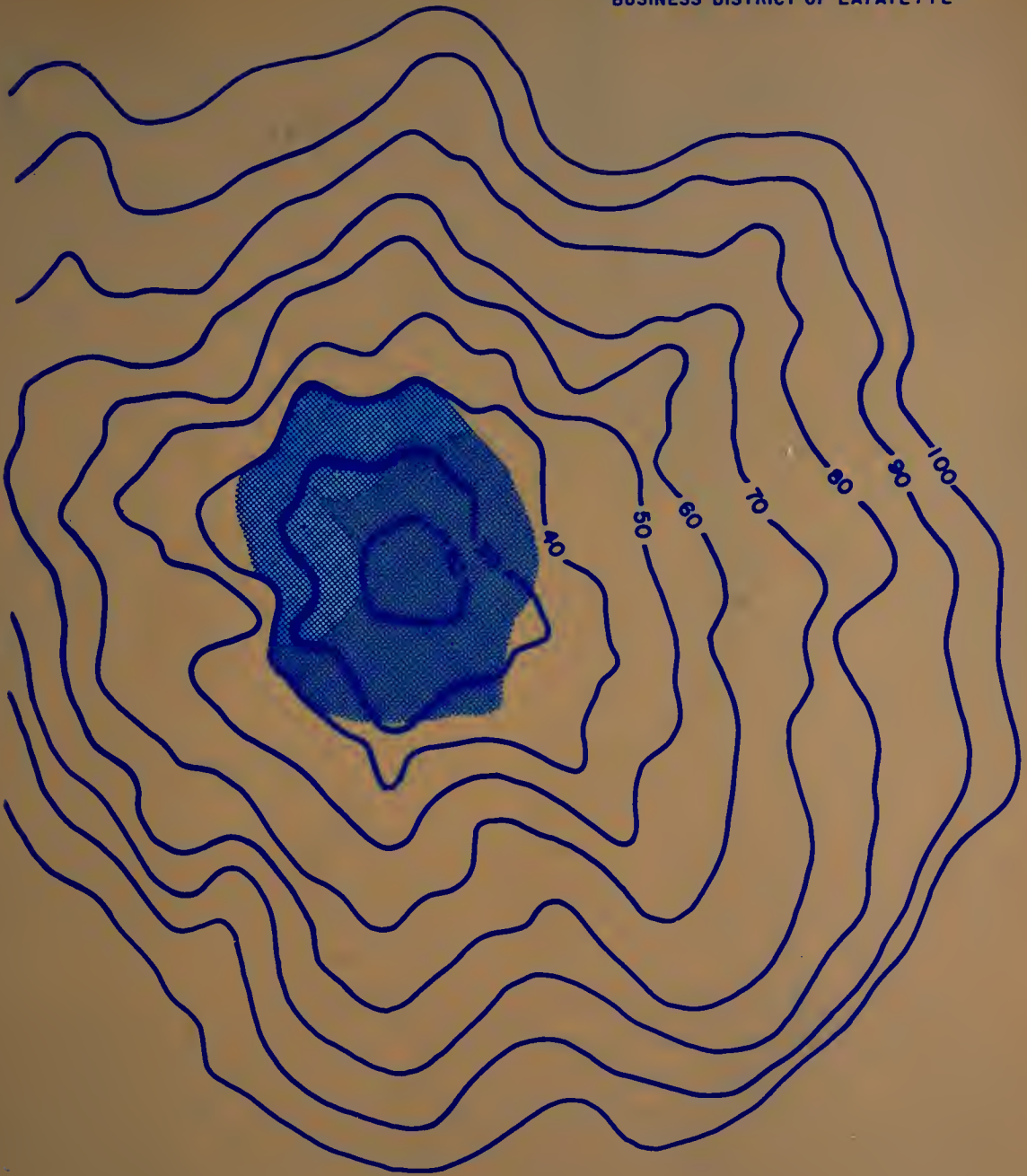
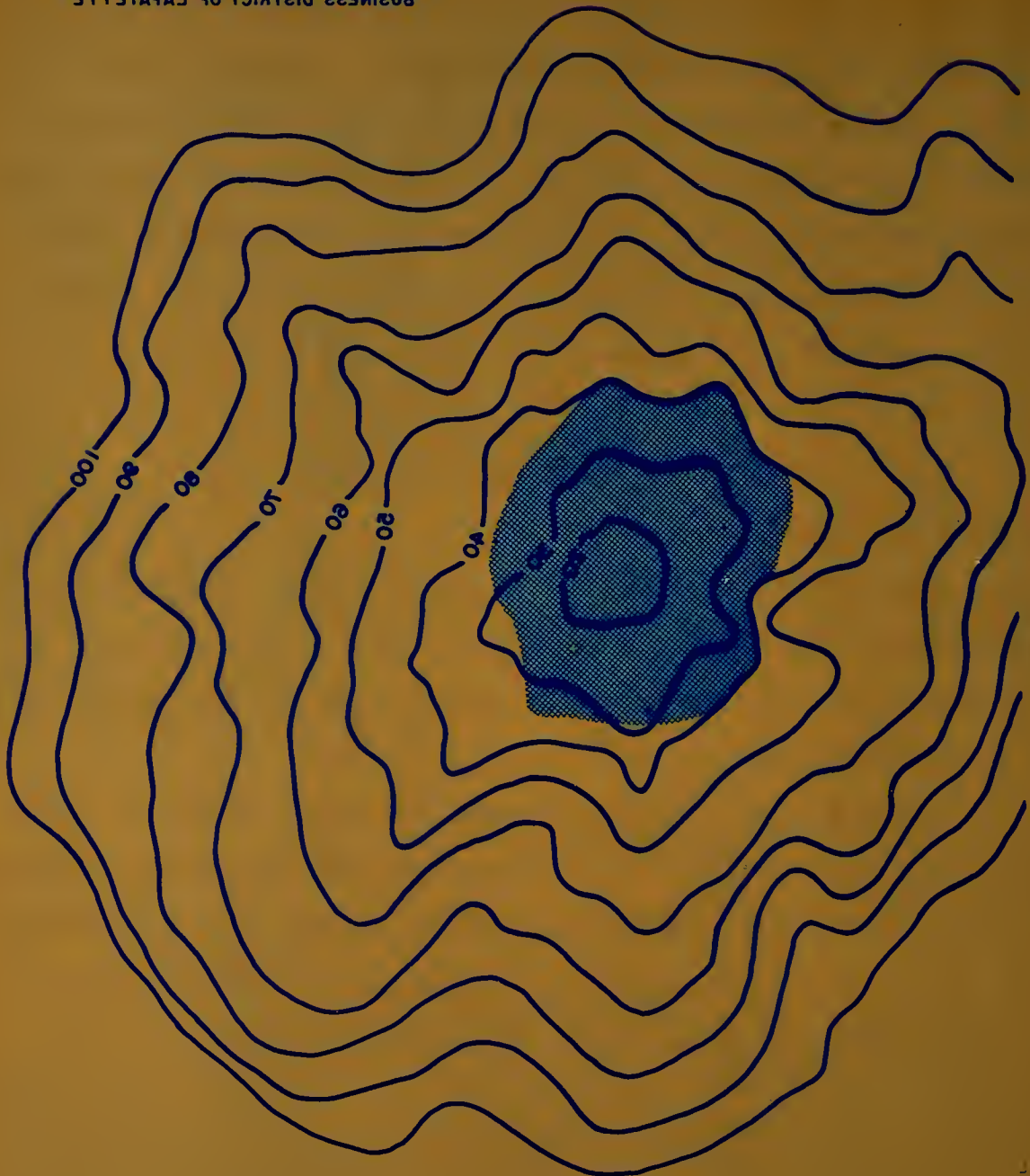
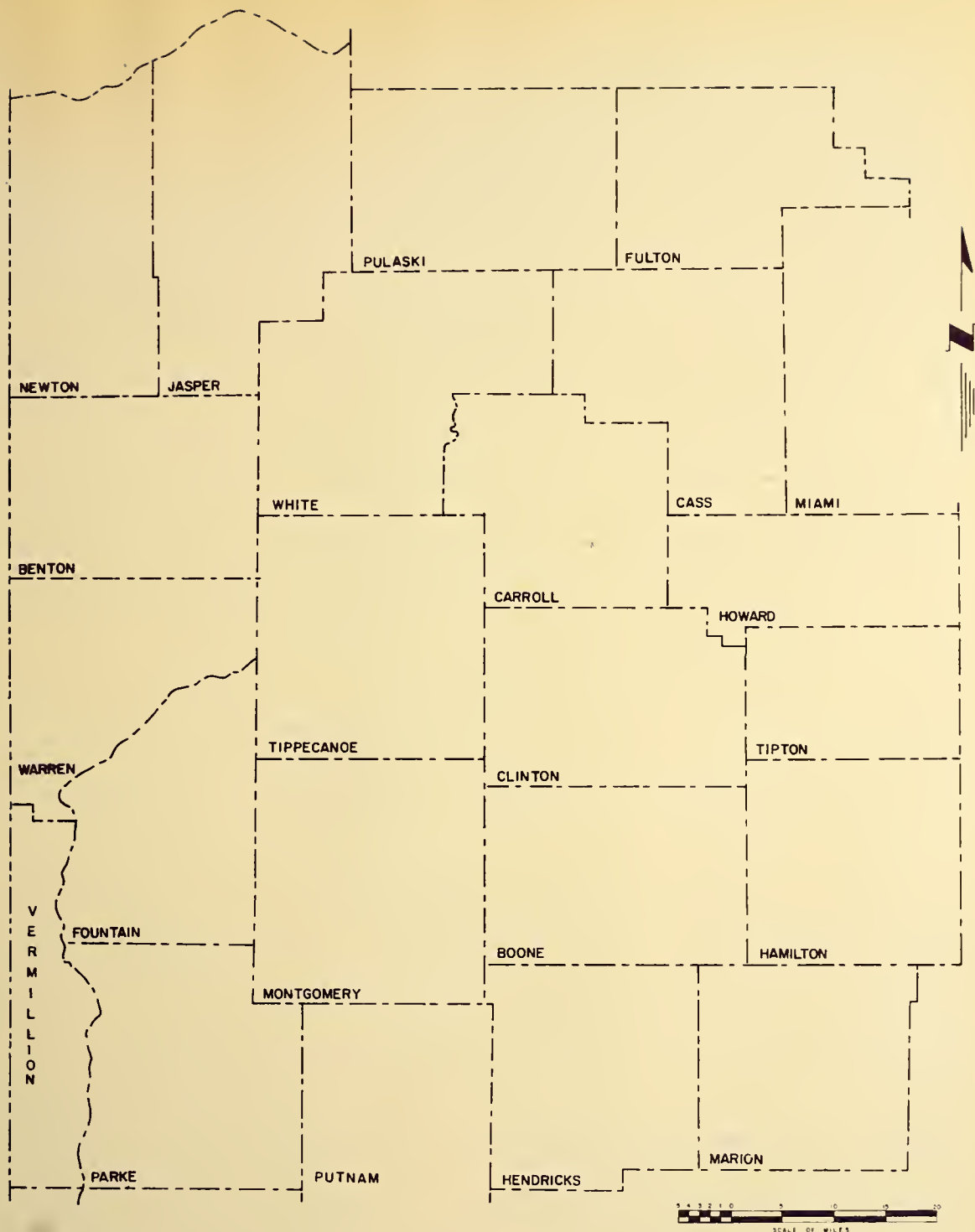


FIGURE 8 PRIMARY TRADE AREA  
TRIBUTARY TO METROPOLITAN LAFAYETTE

TRIBUTARY TO METROPOLITAN LAFAYETTE  
FIGURE 8 PRIMARY TRADE AREA



BUSINESS DISTRICT OF LAFAYETTE  
ORIGINATING FROM THE CENTRAL  
DRIVING TIME CONTOURS IN MINUTES





principle have adapted it for allocating to any number of "towns" the purchases of any number of "intermediate places". By using this adaptation of Reilly's law the purchasing power of each of the townships (intermediate places) in each county within a predetermined area was allocated percentage wise with reasonable accuracy to each of the near by towns. Furthermore, the law was adapted so that the purchases of the residents of the townships were attracted to the retail centers (cities) in direct proportion to the size of the cities (expressed in dollar retail sales of general merchandise, furniture, apparel, and household goods) and inversely as the squares of the distances along highways from the center of the township to the center of the cities. This is expressed as:

$$A = \frac{\frac{F_a}{(D_{1a})^2}}{\sum_{n=b}^{Z+} \frac{F_n}{(D_{1n})^2} + \frac{F_a}{(D_{1a})^2}}$$

where A is the estimated percentage of purchases that city "a" will draw from township 1;  $F_a, F_b, F_c, F_d$ , etc. are the dollar retail sales of general merchandise, furniture, apparel, and household goods in cities a, b, c, d, etc;  $D_{1a}, D_{1b}, D_{1c}, D_{1d}$ , etc., are the distances along the highway between township 1 and the cities.

Figure 9 shows the estimated percentage of expenditures on shopping goods items in the trade area tributary to Metropolitan Lafayette. The zero percent line defines the boundary of the trade area.

It is apparent that while the concept of size and distance as the determining factors in the distribution of trade remains unchanged from Reilly's original formulation, the expression of the size factor has been





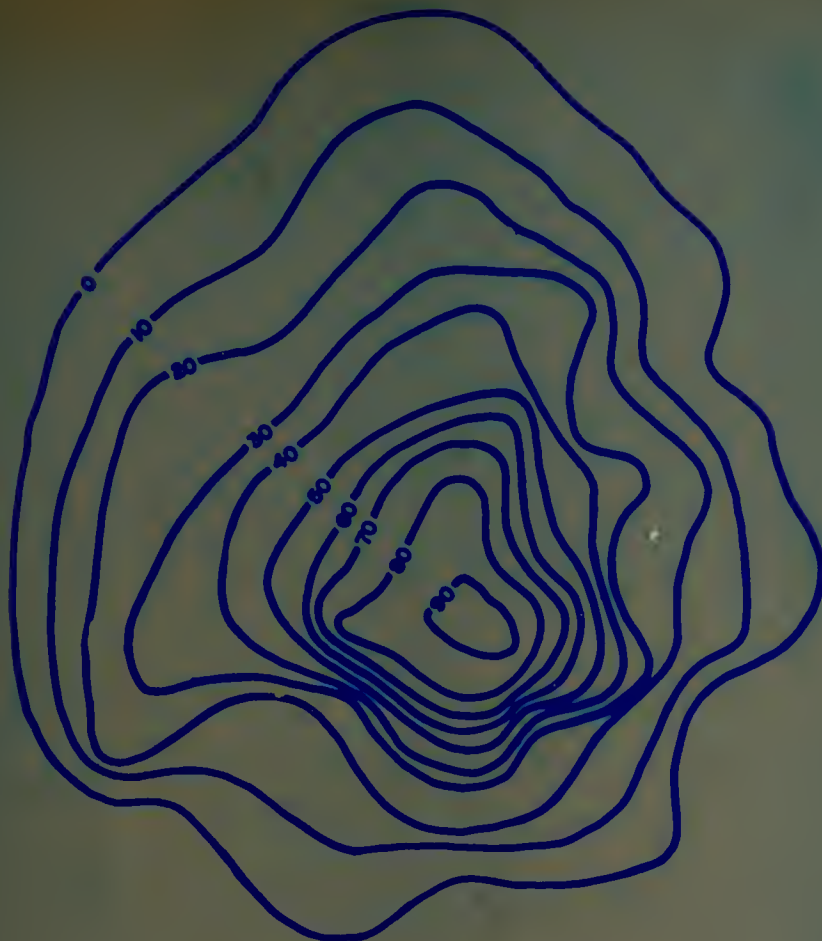


FIGURE 9 ESTIMATED PERCENTAGE OF EXPENDITURES  
ON SHOPPING GOODS ITEMS IN THE TRADE AREA  
TRIBUTARY TO METROPOLITAN LAFAYETTE

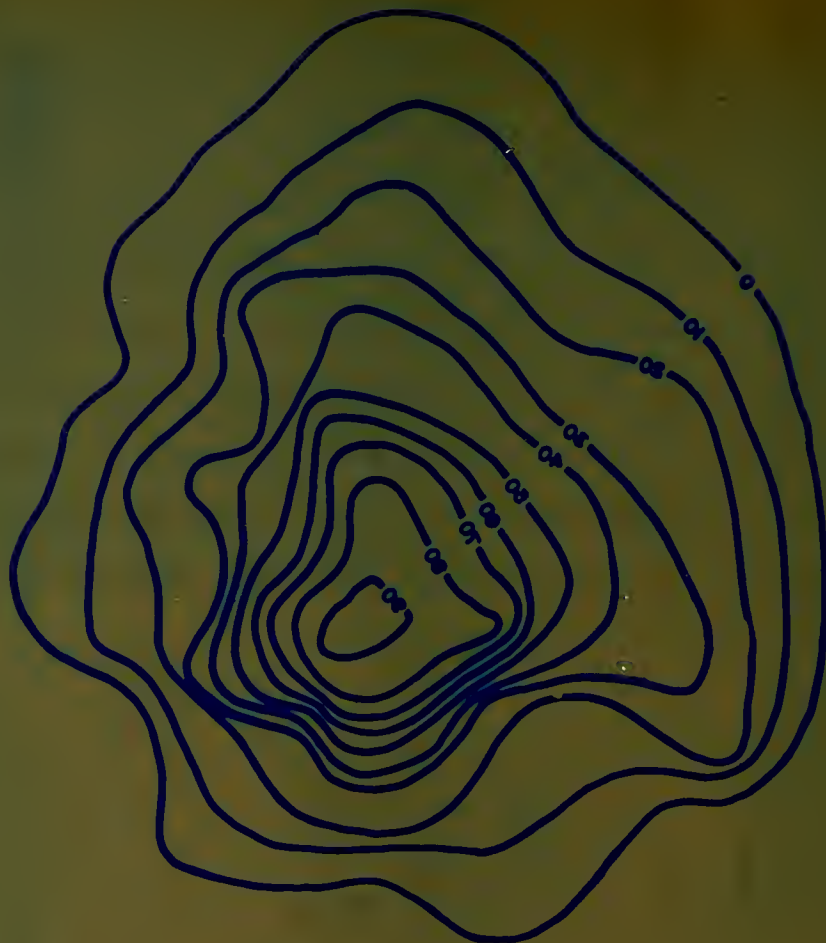
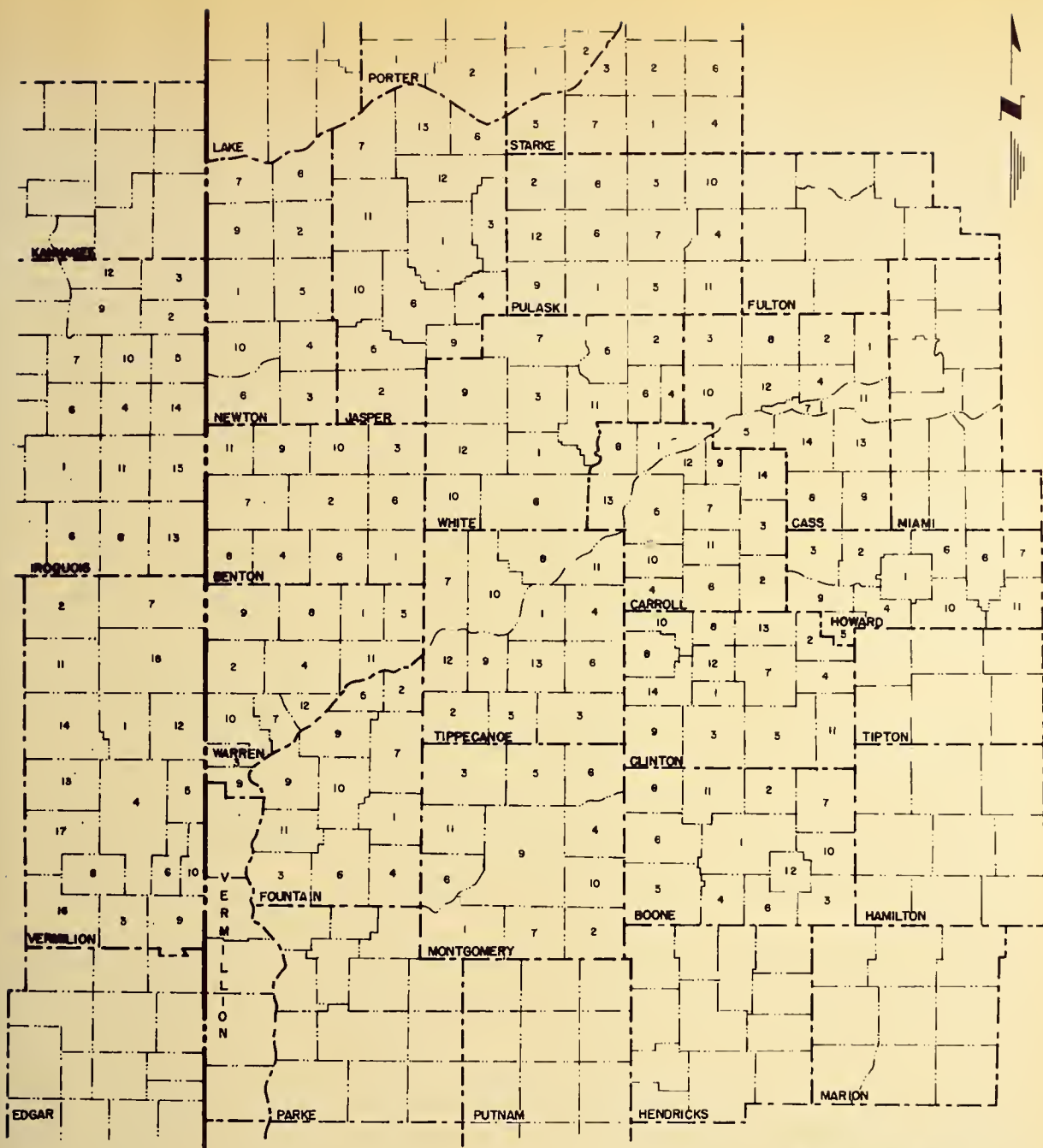


FIGURE 9 ESTIMATED PERCENTAGE OF EXPENDITURES  
ON SHOPPING GOODS ITEMS IN THE TRADE AREA  
TRIBUTARY TO METROPOLITAN LAFAYETTE





0 1 2 3 4 5 6 7 8 9 10  
SCALE OF MILES



radically changed. For the population of the city has been substituted dollar retail sales of general merchandise, furniture, apparel, and household goods. Further, instead of limiting the law's use to measuring the effect of only two cities upon an intermediate population group, this reformation can demonstrate the effect of an infinite number of possible shopping opportunities.

Rephrasing the law in this manner, it is believed, has achieved a more accurate representation of the forces conditioning the consumers' shopping choices. Dollar retail sales implies a measure of the total amount of merchandise available at a given location, and it is generally agreed that the attraction of any retail facility is directly influenced by the amount of dollar sales.

The estimated percentage of expenditures for shopping goods items that would be spent in Lafayette from the trade area by townships tributary to Metropolitan Lafayette is shown in Table 1. In order that these percentage figures in Table 1 can be oriented in the trade area, Figure 10 is provided. The code numbers for each township in each county in Table 1 correspond to the numbered townships in the same county on Figure 10.

### Population

Population growth in the trade area has been high and is continuing at a substantial rate. The population figures from 1950 through 1965 are shown graphically on Figure 11. The present and anticipated population of the various areas in the trade area are summarized in Table 2.

The official population of Lafayette in the 1950 census was 35,568, and for West Lafayette, it was 11,873. The population of Tippecanoe County was 74,473. Since that time considerable growth has taken place



Table 1  
Estimated Percentage of Expenditures on Shopping Goods Items  
in Total Trade Area Tributary to Metropolitan Lafayette

County and Township	Code No.	Per Cent	County and Township	Code No.	Per Cent
<b>INDIANA</b>					
<b>Benton</b>			<b>Cass</b>		
Bolivar	1	65.0	Adams	1	-
Center	2	40.9	Bethlehem	2	-
Gilboa	3	41.9	Boone	3	5.0
Grant	4	33.1	Clay	4	-
Hickory Grove	5	26.8	Clinton	5	5.5
Oak Grove	6	48.8	Deer Creek	6	1.0
Parish Grove	7	27.7	Eel	7	-
Pine	8	57.2	Harrison	8	-
Richland	9	26.4	Jackson	9	-
Union	10	29.5	Jefferson	10	5.0
York	11	20.0	Miami	11	-
			Noble	12	-
			Tipton	13	-
			Washington	14	-
<b>Boone</b>			<b>Clinton</b>		
Center	1	-	Center	1	1.5
Clinton	2	-	Forest	2	-
Eagle	3	-	Jackson	3	1.3
Harrison	4	-	Johnson	4	-
Jackson	5	-	Kirklin	5	-
Jefferson	6	1.0	Madison	6	49.6
Marion	7	-	Michigan	7	0.2
Perry	8	-	Owen	8	17.2
Sugar Creek	9	8.8	Perry	9	16.2
Union	10	-	Ross	10	32.6
Washington	11	2.5	Sugar Creek	11	-
Worth	12	-	Union	12	10.0
			Warren	13	9.0
			Washington	14	14.8
<b>Carroll</b>			<b>Fountain</b>		
Adams	1	23.9	Cain	1	7.4
Purlington	2	9.2	Davis	2	27.1
Carrollton	3	7.7	Fulton	3	-
Clay	4	35.0	Jackson	4	3.0
Deer Creek	5	32.0	Logan	5	17.5
Democrat	6	18.9	Mill Creek	6	1.5
Jackson	7	24.0	Richland	7	16.0
Jefferson	8	32.0	Shawnee	8	13.0
Liberty	9	16.3	Troy	9	2.5
Madison	10	32.0			
Monroe	11	19.6			
Rock Creek	12	24.4			
Tippecanoe	13	45.0			
Washington	14	5.7			



Table 1 (Continued)

County and Township	Code No.	Per Cent	County and Township	Code No.	Per Cent
Fountain (Cont'd)			New Durham	13	-
Van Buren	10	8.0	Noble	14	-
Wabash	11	-	Pleasant	15	-
			Prairie	16	-
Howard			Scipio	17	-
Center	1	-	Springfield	18	-
Clay	2	-	Union	19	-
Ervin	3	3.0	Washington	20	-
Farrison	4	-	Wills	21	-
Honey Creek	5	-			
Howard	6	-	Montgomery		
Jackson	7	-	Brown	1	-
Liberty	8	-	Clark	2	-
Monroe	9	3.0	Coal Creek	3	25.1
Taylor	10	-	Franklin	4	2.5
Union	11	-	Madison	5	26.3
			Ripley	6	2.0
Jasper			Scott	7	-
Parkley	1	14.6	Sugar Creek	8	20.2
Carpenter	2	25.0	Union	9	1.0
Gillam	3	19.9	Walnut	10	-
Hanging Grove	4	28.5	Wayne	11	5.7
Jordan	5	20.0			
Kankakee	6	5.0	Newton		
Keener	7	1.5	Peaver	1	5.0
Marion	8	20.0	Colfax	2	3.0
Milroy	9	30.0	Grant	3	25.0
Newton	10	11.0	Iroquois	4	15.0
Union	11	9.0	Jackson	5	9.0
Walker	12	10.4	Jefferson	6	20.0
Wheatfield	13	2.5	Lake	7	-
			Lincoln	8	-
Laporte			McClellan	9	1.0
Cass	1	0.9	Washington	10	9.5
Center	2	-			
Clinton	3	-	Porter		
Cool Spring	4	-	Boone	1	-
Dewey	5	-	Center	2	2.0
Galena	6	-	Jackson	3	-
Hanna	7	-	Liberty	4	-
Hudson	8	-	Morgan	5	-
Johnson	9	-	Pine	6	-
Kankakee	10	-	Pleasant	7	-
Lincoln	11	-	Portage	8	-
Michigan	12	-	Porter	9	-





Table 1 (Continued)

County and Township	Code No.	Per Cent	County and Township	Code No.	Per Cent
Porter (Cont'd)			Warren		
Union	10	-	Adams	1	49.5
Washington	11	-	Jordan	2	30.0
Westchester	12	-	Kent	3	7.2
			Liberty	4	22.5
Pulaski			Medina	5	80.0
Beaver	1	20.0	Mound	6	-
Cass	2	9.5	Pike	7	16.4
Franklin	3	1.0	Pine	8	40.2
Harrison	4	0.5	Prairie	9	35.9
Indian Creek	5	10.0	Steuben	10	22.2
Jefferson	6	10.0	Warren	11	40.6
Monroe	7	3.0	Washington	12	17.8
Rich Grove	8	4.0			
Salem	9	25.4	White		
Tippecanoe	10	-	Big Creek	1	66.3
Van Buren	11	3.0	Cass	2	17.7
White Post	12	18.8	Honey Creek	3	48.0
			Jackson	4	12.0
Starke			Liberty	5	32.8
California	1	-	Lincoln	6	20.0
Center	2	-	Monon	7	40.6
Davis	3	-	Prairie	8	78.4
Jackson	4	-	Princeton	9	47.5
North Bend	5	4.0	Round Grove	10	76.2
Oregon	6	-	Union	11	34.0
Railroad	7	0.9	West Point	12	56.2
Washington	8	-			
Wayne	9	-	ILLINOIS		
Tippecanoe			Iroquois		
Fairfield	1	91.6	Artesia	1	-
Jackson	2	39.5	Ash Grove	2	0.8
Lauramie	3	38.5	Ashkum	3	-
Perry	4	76.1	Beaver	4	-
Randolph	5	55.3	Beaverville	5	3.0
Sheffield	6	62.0	Belmont	6	-
Shelby	7	78.0	Chebanse	7	-
Tippecanoe	8	77.7	Concord	8	0.9
Union	9	83.5	Crescent	9	-
Wabash	10	86.1	Danforth	10	-
Washington	11	56.8	Douglas	11	0.5
Wayne	12	70.4	Fountain Creek	12	-
Wea	13	85.3	Iroquois	13	11.0



Table 1 (Continued)

County and Township	Code No.	Per Cent	County and Township	Code No.	Per Cent
Iroquois (Cont'd)			Carroll	3	-
Loda	14	5.0	Catlin	4	-
Lovejoy	15	9.5	Danville	5	-
Martinton	16	-	Elwood	6	-
Middleport	17	-	Georgetown	7	8.0
Milford	18	-	Grant	8	-
Milks Grove	19	-	Jamaica	9	-
Onarga	20	-	Love	10	-
Papingau	21	-	McKendree	11	-
Pigeon Grove	22	-	Middlefork	12	8.0
Prairie Green	23	-	Newell	13	-
Rigeland	24	-	Oakwood	14	-
Sheldon	25	-	Pilot	15	8.0
Stockland	26	-	Ross	16	-
			Sidell	17	-
Vermilion			South Ross	18	-
Blount	1	-	Vance	19	-
Butler	2	-			



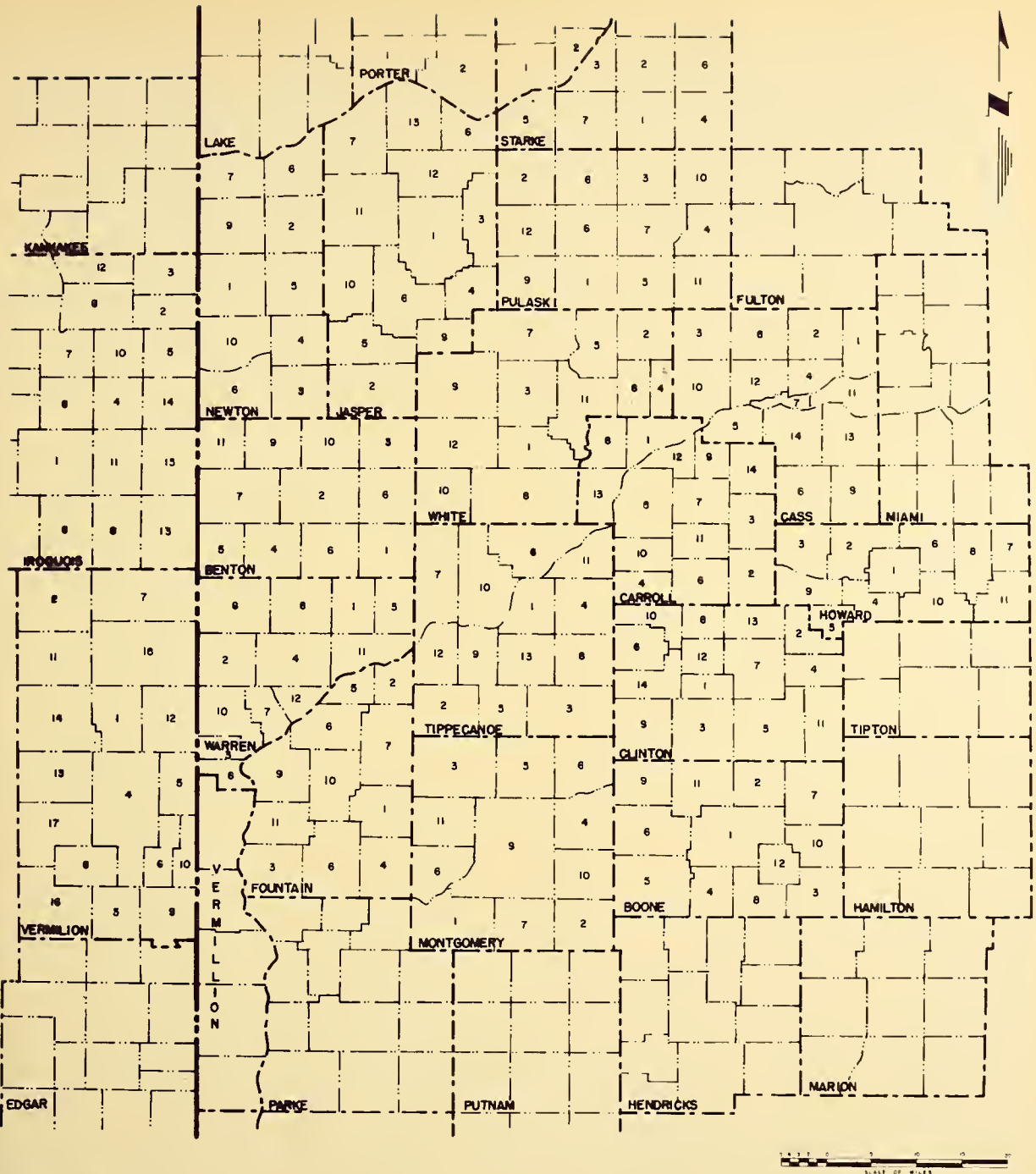
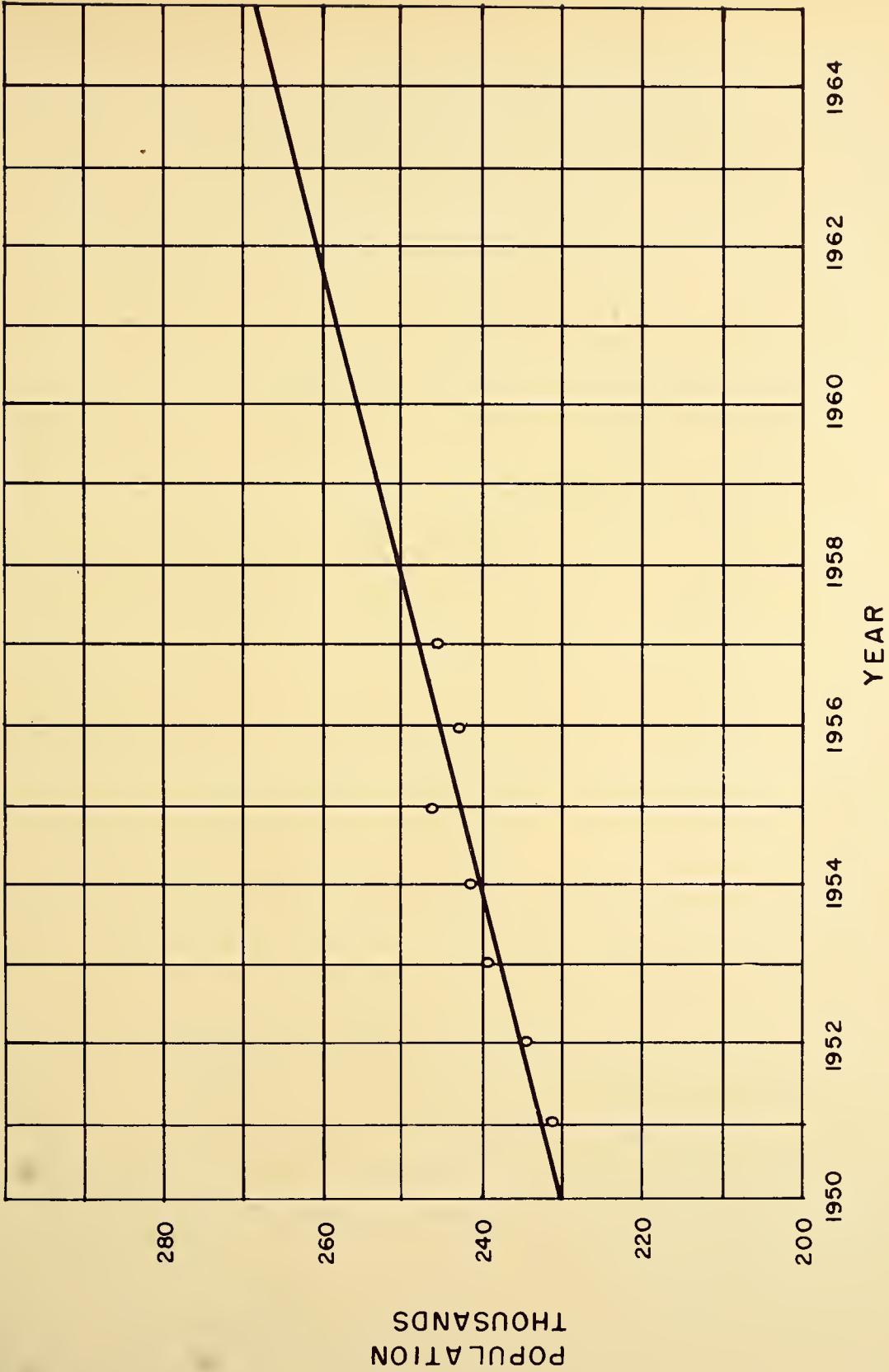


FIGURE 10 COUNTIES AND TOWNSHIPS IN  
NORTHWESTERN INDIANA





**FIGURE II ESTIMATED TRADE AREA POPULATION TREND**





Table 2  
Estimated Trade Area Population

Area	Year			
	1950	1955	1960*	1965*
Lafayette-West Lafayette	47,400	50,900	56,500	61,000
Tippecanoe County	74,500	84,800	91,400	100,000
Total Trade Area	231,200	243,000	255,500	268,100

\* Population is estimated.



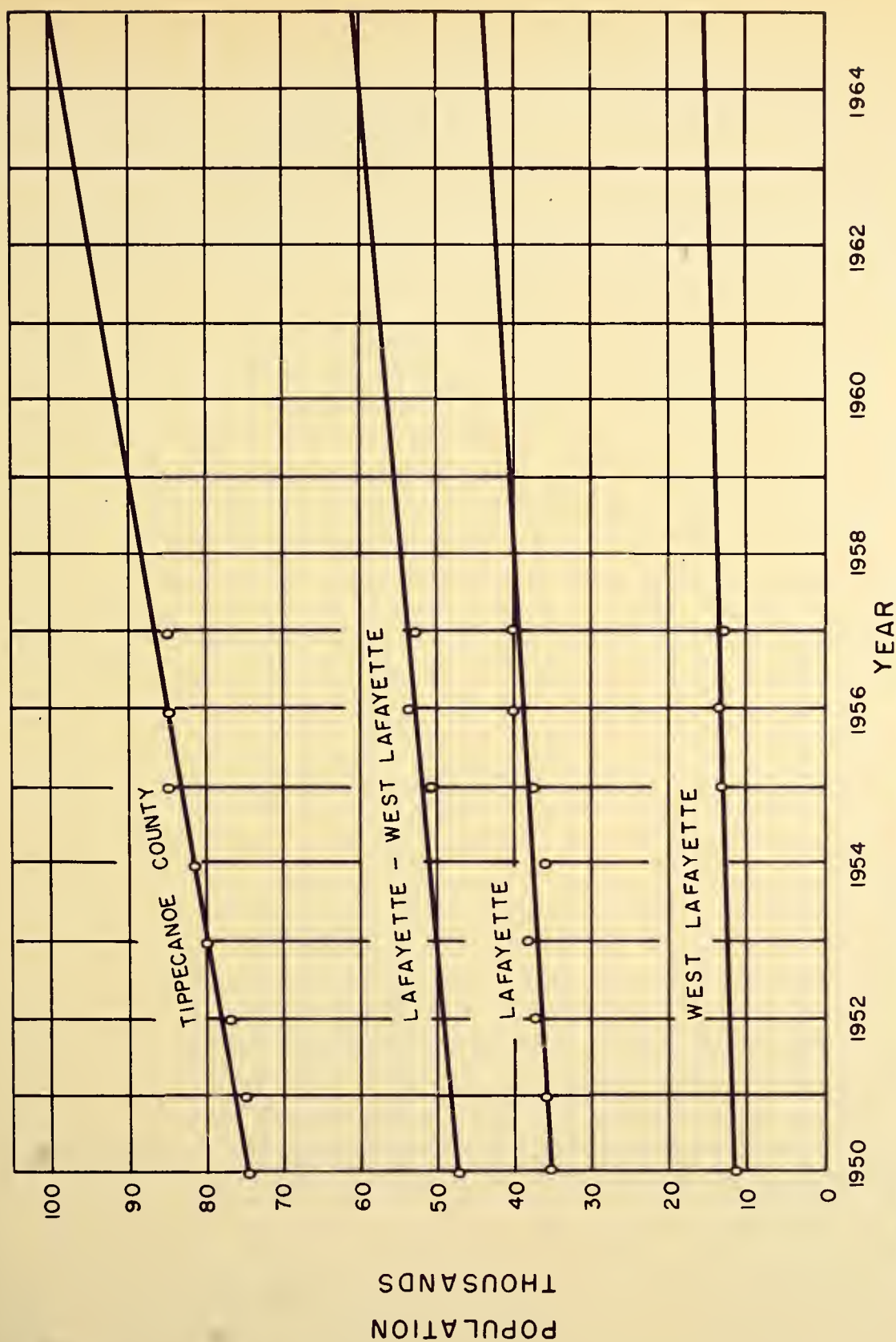
in both Lafayette and West Lafayette as evidenced by the increased installation for various public utilities. Surveys of population growth from 1950 to 1955 have been made by a number of different agencies - Survey engineers of the General Telephone Company, the Public Service Company, Lafayette Water Works, Sales Management, and the Department of Economics at Purdue University. A general average from all this information indicated the population of Lafayette on January 1, 1956 as 40,300, West Lafayette as 13,600 and Tippecanoe County, 85,000. During the fall of 1956 the U. S. Bureau of the Census made a special population survey in Lafayette and West Lafayette. As of December 31, 1956, Lafayette had a population of 39,870 and West Lafayette 13,130.

The estimated population figures in Tippecanoe County from 1950 through 1965 are shown graphically on Figure 12.

Population in the total trade area is estimated to increase from 245,000 in 1957 to 268,100 in 1965. This is an increase of 22,200 or 9 percent over 1957 population. Population in Tippecanoe County is estimated to increase from 85,000 in 1957 to 100,000 in 1965. This is an increase of 15,000 or 18 percent over 1957 population. From Figures 11 and 12 it is evident that two-thirds of the population increase in total trade area occurs in Tippecanoe County.

Within the metropolitan area of Lafayette, growth has been fairly rapid in the years since 1950. As is shown in Table 2 there has been a large increase in the non-city population since 1950 but only a small part of this increase can be accounted for in the strictly rural farming areas. It is felt that the largest portion of this increase is attributable to suburbs rather than rural growth. Most of this type of increase is found in the areas immediately adjacent to the single large urban complex





**FIGURE 12 ESTIMATED POPULATION TRENDS IN TIPPECANOE COUNTY**



in the area - Lafayette and West Lafayette. Thus, it would be safe to estimate that there will probably be nearly 69,000 people in urbanized areas by 1960 and 77,000 by 1965.

Since West Lafayette is also the home of Purdue University, there is a large student population in the area in addition to the regular residents. In 1940 and prior, the U. S. Census included university students only if they were actually permanent residents. This was changed with the 1950 census to include all students in the local count regardless of their permanent place of residence. A very large portion of the student housing facilities is located outside the corporate limits of West Lafayette and hence such students are included in the county but not in the corporate limits of the city in years following 1950. The table which follows indicates the student population for the present and for selected future years to 1965. This information was obtained from the University officials.

#### Purdue University Enrollment

<u>1955</u>	<u>1960</u>	<u>1965</u>
11,400	14,450	20,500

#### Income and Buying Power

Per capita incomes of the trade area and the distribution of that income are of paramount importance in calculating the volume of sales. Families in the United States of all income groups normally spend about 58 percent of their income in the retail stores.

Incomes in the trade area are high. The Lafayette metropolitan area, and especially the city of West Lafayette, has a very high per family annual income. For many years the area has been a high income district, and this pattern has continued to the present time. The northern portion





of West Lafayette and the southern portion of Lafayette are areas of fine homes and the new residential developments planned are on the same high level, so that the future trend in buying power is on the increase.

Rural incomes are high in the trade area but the farmer contributes little to the sales potential.

The university student population, which is tributary to some extent to Greater Lafayette, is also not a major factor in the sales potential, although, in some retail categories their share of the potential is substantial.

The effective buying income trend in the trade area is shown graphically on Figure 13. It should be pointed out that Greater Lafayette can only expect to attract a certain portion of this income.

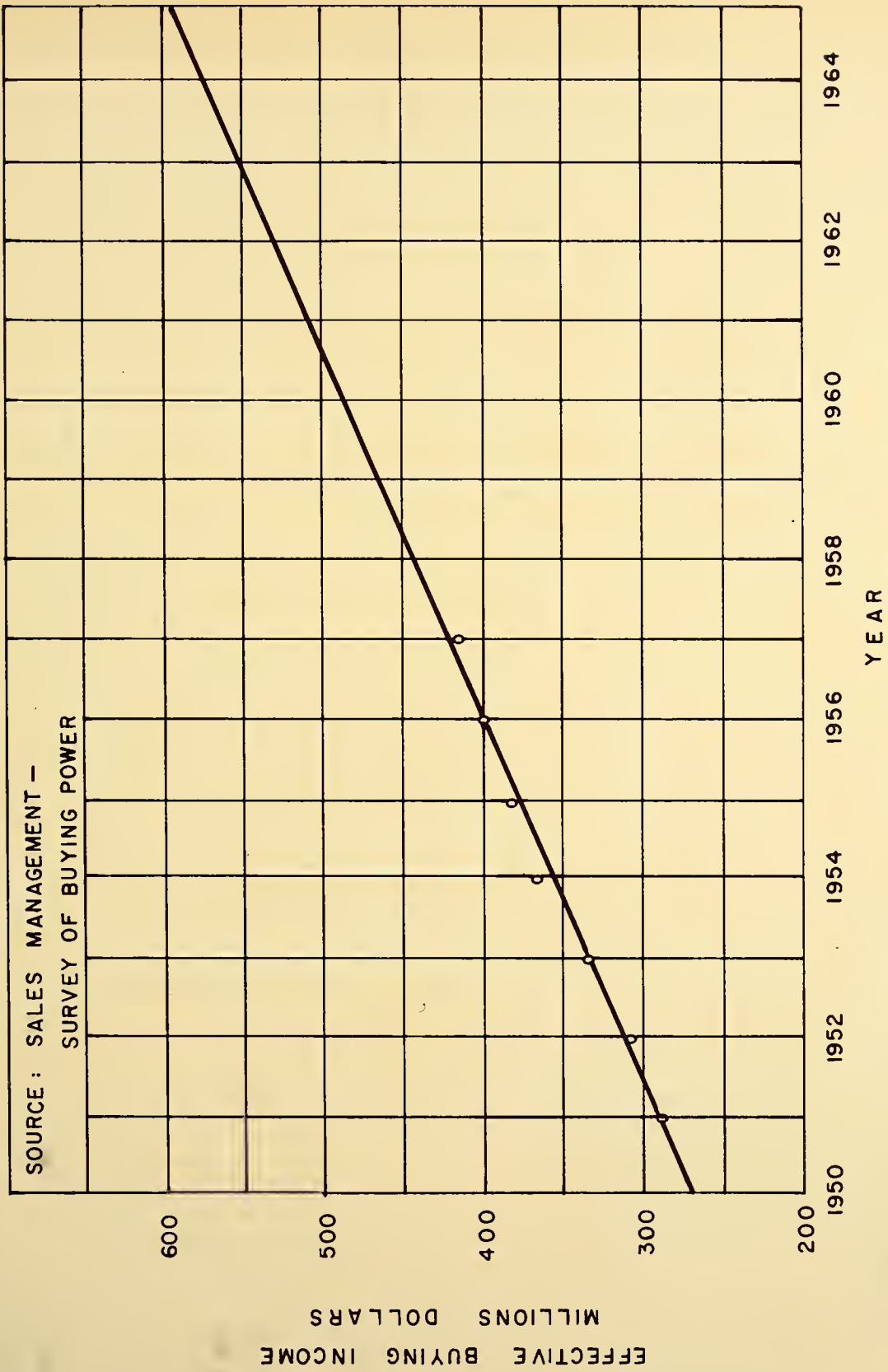
The effective buying income distribution per consumer spending unit by areas, is shown in Table 3.

Probably some confusion may center about the concept of "consumer spending unit" and "family". The concept of family is derived from the government definition of a "household", which includes all persons occupying a house, an apartment or other groups of rooms, or a room regarded as a dwelling unit. A consumer spending unit, a more extensive term, covers households, doubledup families and individuals living in quarters not classified as a dwelling unit (boarding houses, hotels, military barracks, colleges, etc.)

The average family effective buying income as of January 1, 1957 in Tippecanoe County is shown in Table 4.

The average per capita effective buying income in the trade area as of January 1957 amounted to \$1700. For 1965, it is estimated that the per capita income will reach \$2,360. It is estimated that trade area





**FIGURE 13 EFFECTIVE BUYING INCOME TREND  
IN THE TRADE AREA**



Table 7

Percentage Distribution of Income  
Groups in Tippecanoe County - 1957 (2)

Area	Income Breakdown of Families Receiving Grants				
	Under \$2,000	\$2,000 - \$4,000	\$4,000 - \$6,000	\$6,000 - \$10,000	Over \$10,000
West Lafayette	19.8	19.7	31.5	12.9	27.5
Lafayette	9.0	17.7	37.1	14.9	21.3
Tippecanoe County	12.9	19.1	31.9	17.3	28.2



Table 4

Per Family and Per Capita Effective  
Buying Income in Tippecanoe County - 1957 (10)

Area	Effective Buying Income	
	Per Family	Per Capita
West Lafayette	\$ 13,031	\$ 2,711
Lafayette	5,641	1,781
Lafayette-West Lafayette	7,100	2,034
Tippecanoe County	6,744	1,896





residents spend on the average of \$985 per capita on retail expenditures, and the total retail expenditures by people in the trade area will be \$400 million during the current year. The per capita effective buying income trend in the trade area is shown graphically on Figure 14.

### Retail Expenditures

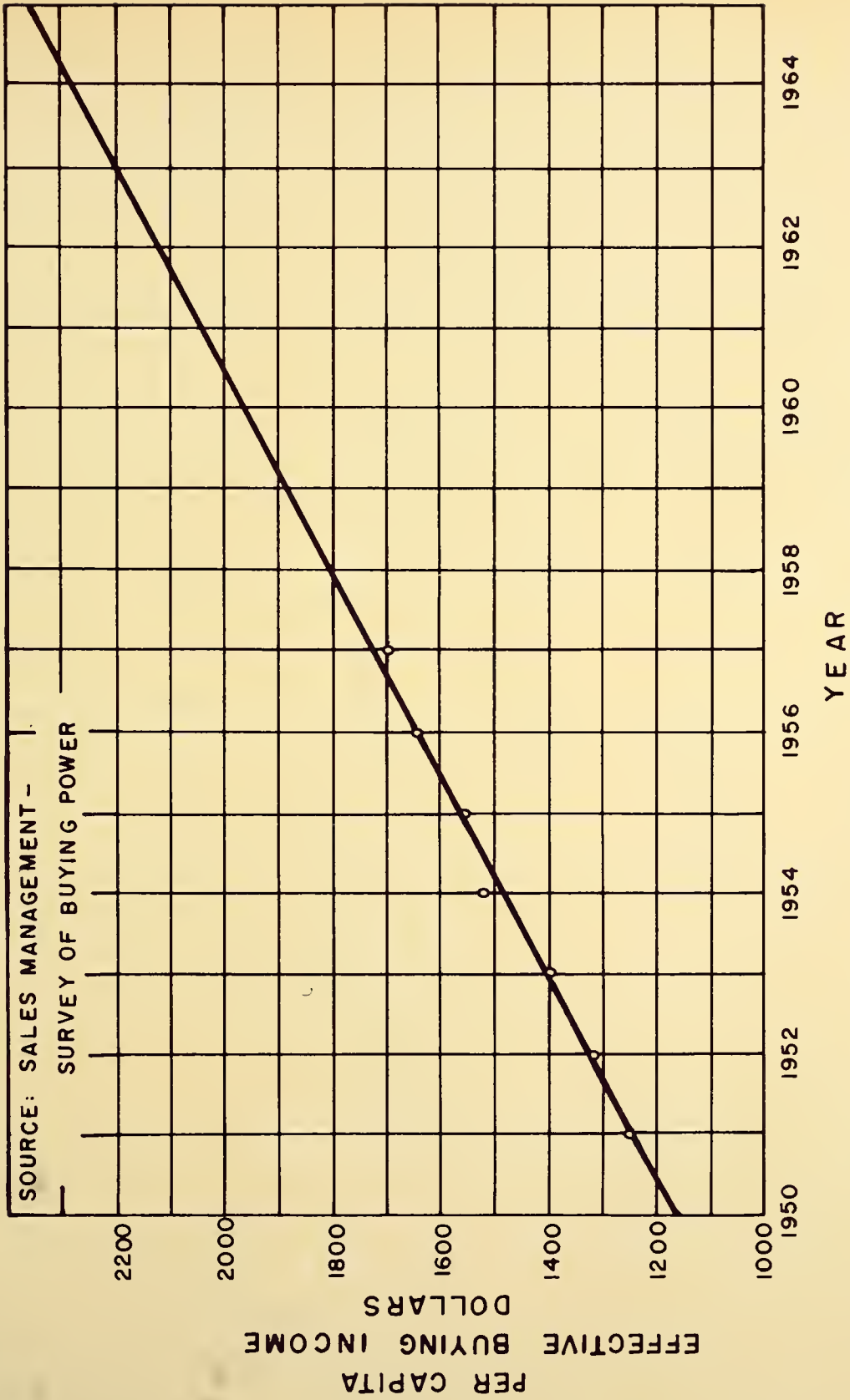
Estimated expenditures on convenience and shopping goods items in the primary trade area tributary to Metropolitan Lafayette are indicated in Table 5.

For primary trade area residents, the per capita retail expenditures for convenience goods is estimated at \$700. The selected items considered convenience goods are: food; eating and drinking; automotive goods; gas station goods; lumber, building material, and hardware; and drug store items. This leaves: apparel, general merchandise, furniture, and household appliances to be classified as shopping goods items. The per capita Purdue Student expenditure for convenience goods items is estimated at \$144 while expenditures for shopping goods amount to \$110.

Table 6 indicates the estimated expenditures on shopping goods items in the trade area, exclusive of the primary trade area, but tributary to Metropolitan Lafayette.

In the trade area outside of the primary, the residents shop for convenience goods within their locality. For shopping goods items, Lafayette attracts only a certain amount of their total expenditures. The estimated per capita expenditures for shopping goods varies from \$206 in Fountain County to as high as \$478 in Howard County. The per capita expenditures for shopping goods have been calculated on the basis of population incomes, expenditures for convenience goods, and trade area effectiveness.





**FIGURE 14 PER CAPITA EFFECTIVE BUYING INCOME  
TREND IN THE TRADE AREA**



Table 5

Estimated Expenditures on Convenience and Shopping Goods Items in the  
Primary Trade Area Tributary to Metropolitan Lafayette

County	Trade Area Population	Dollar Per Capita Expenditures		Dollar Expenditures Tributary to Lafayette	
		Con.Goods	Shop.Goods	Con.Goods	Shop.Goods
Benton	650	700	329	256,000	139,000
Carroll	1740	700	276	686,000	170,000
Clinton	980	700	404	386,000	129,000
Tippecanoe	85000	700*	360*	47,486,000	24,564,000
Warren	180	700	320	71,000	46,000
White	1570	700	203	658,000	261,000
Total	90220			49,543,000	25,309,000

\* Permanent residents only



Table 6

Estimated Expenditures on Shopping Goods Items in the Trade Area,  
Exclusive of the Primary Trade Area, Tributary to Metropolitan  
Lafayette

County	Trade Area Population	Dollar Per Capita Expenditures on Shopping Goods	Dollar Expenditures on Shopping Goods Tributary to Metro- politan Lafayette
Benton	1,260	329	1,290,000
Boone	3,310	471	103,000
Carroll	14,770	276	1,035,000
Cass	6,730	379	126,000
Clinton	12,490	404	703,000
Fountain	13,280	206	324,000
Howard	1,300	478	18,000
Jasper	16,810	243	684,000
LaPorte	300	271	1,000
Montgomery	8,270	389	382,000
Newton	8,900	400	528,000
Porter	8,000	385	62,000
Pulaski	9,060	328	350,000
Starke	1,200	222	9,000
Warren	7,610	320	716,000
White	16,720	203	1,342,000
Iroquois (Ill.)	3,370	336	69,000
Vermilion (Ill.)	10,970	346	304,000
Total	153,350		\$8,046,000





Total estimated expenditures in the trade area tributary to Metropolitan Lafayette is estimated to be \$82,898,000 in 1957. The breakdown of this figure by trade area and amount of sales is indicated in Table 7.

Estimated total retail sales amounting to \$82,898,000 is what Metropolitan Lafayette can attract from its vicinity without improving its present retailing facilities in the central business district or in outlying areas. For the past number of years Metropolitan Lafayette has been unable to attract the increases in retailing expenditures accruing in the vicinity. A great number of people in Lafayette at the present time prefer to drive 60 miles to Indianapolis to shop for department store goods rather than use the facilities provided in the central business district of Lafayette. Therefore, it is not only the traffic congestion that repels shoppers from Lafayette's central business district but also a lack of store modernization and poor selection of department store goods. In most national cases the department store sales per square foot of area amounted to \$50 to \$60 in 1955. In Lafayette the average sales per square foot for department store goods was nearly \$35 at that time and it is believed that this figure has not changed since (11).

#### Sales Planned in Metropolitan Lafayette

At the present time four shopping centers are being planned for the Lafayette area. The Market Square shopping center will probably be the first to open, followed by the Jefferson Square, Wabash Village, and finally the Levee Shopping Center.

In order that Market Square shopping center can operate efficiently or even maintain itself, its estimated yearly sales should amount to \$9,057,500. Of this figure \$4,877,500 is estimated to come from shopping



Table 7

Total Estimated Expenditures in the Trade Area  
Tributary to Metropolitan Lafayette

Type of Goods	Total Estimated Expenditures Tributary to Metropolitan Lafayette
Convenience Goods	
Tippecanoe County	\$47,486,000
Primary Trade Area Exclusive Tippecanoe County	2,057,000
Shopping Goods	
Tippecanoe County	24,564,000
Primary Trade Area Exclusive Tippecanoe County	745,000
Trade Area Exclusive Primary	8,046,000
Total	\$82,898,000



goods sale and \$4,180,000 from convenience goods sale. The estimated breakdown of square footage of floor area and the total amount of sales for the Market Square Shopping Center is shown in Table 8.

The gross annual retail sales in the Jefferson Square Shopping Center is estimated to be \$3,127,000. Of this \$732,000 is estimated to come from shopping goods sales and \$2,425,000 from convenience goods sales. At the present time, there exists 11,400 square feet of floor area which is not appropriated to any type of retail facility. Fifty dollars per square foot is a safe estimate for this space which will be assigned to some type of retailing later on. The square footage of floor area and estimated total sales is shown in Table 9.

Figure 15 shows the tenancy for the Jefferson Square Shopping Center proposed by the developers. The four buildings on the left labeled as shops, totaling 45,300 square feet of floor area, constitute the second stage of the development and are not considered in this report.

The annual retail sales for the Wabash Village Shopping Center have been estimated by Larry Smith, economics consultant (12). Estimated annual sales and square footage of floor area are shown in Table 10.

Figure 16 shows the tenancy for the Wabash Village Shopping Center prepared by Larry Smith, economic consultant.

The planning of the Levee Shopping Center is in its infancy. At the present time earth moving and grading is taking place. No plans have been drawn nor has there been a market analysis made. It is evident that this center cannot be a regional or a community type shopping center; therefore, it is assumed to be a neighborhood type. The size will depend entirely upon the potential sales in the vicinity.



Table 8

Estimated Sales Expectancy for Class of Outlets  
in Market Square Shopping Center

Class of Outlet	Square Feet of Gross Sales Area for Each Class of Outlet	Total Expectancy Retail Sales
<hr/>		
Shopping Goods		
Department Store	52,000	\$2,860,000
Apparel	15,500	852,500
Furniture	12,000	480,000
Variety	10,000	400,000
Other	5,000	285,000
	<hr/>	<hr/>
	94,500	\$4,877,500
 Convenience Goods		
Food	18,500	\$1,885,000
Drugstore	15,000	945,000
Restaurant	10,000	550,000
Hardware	8,000	400,000
 Services		
	10,000	400,000
	<hr/>	<hr/>
	61,500	\$4,180,000
 Institutions		
	6,000	-
	<hr/>	<hr/>
Total	162,000	\$9,057,000
<hr/>		





Table 9

Estimated Retail Sales Expectancy for Class of Outlets  
in Jefferson Square Shopping Center

Class of Outlet	Square Feet of Gross Sales Area for Each Class of Outlet	Total Expectancy Retail Sales
Food	15,800	\$1,738,000
Drugstore	6,000	390,000
Restaurant	5,400	297,000
	<hr/> 27,200	<hr/> \$2,425,000
Women's Wear	2,400	\$ 132,000
Space not Appropriated for	11,400	\$ 570,000
Bank	2,438	--
Total	<hr/> 43,438	<hr/> \$3,127,000



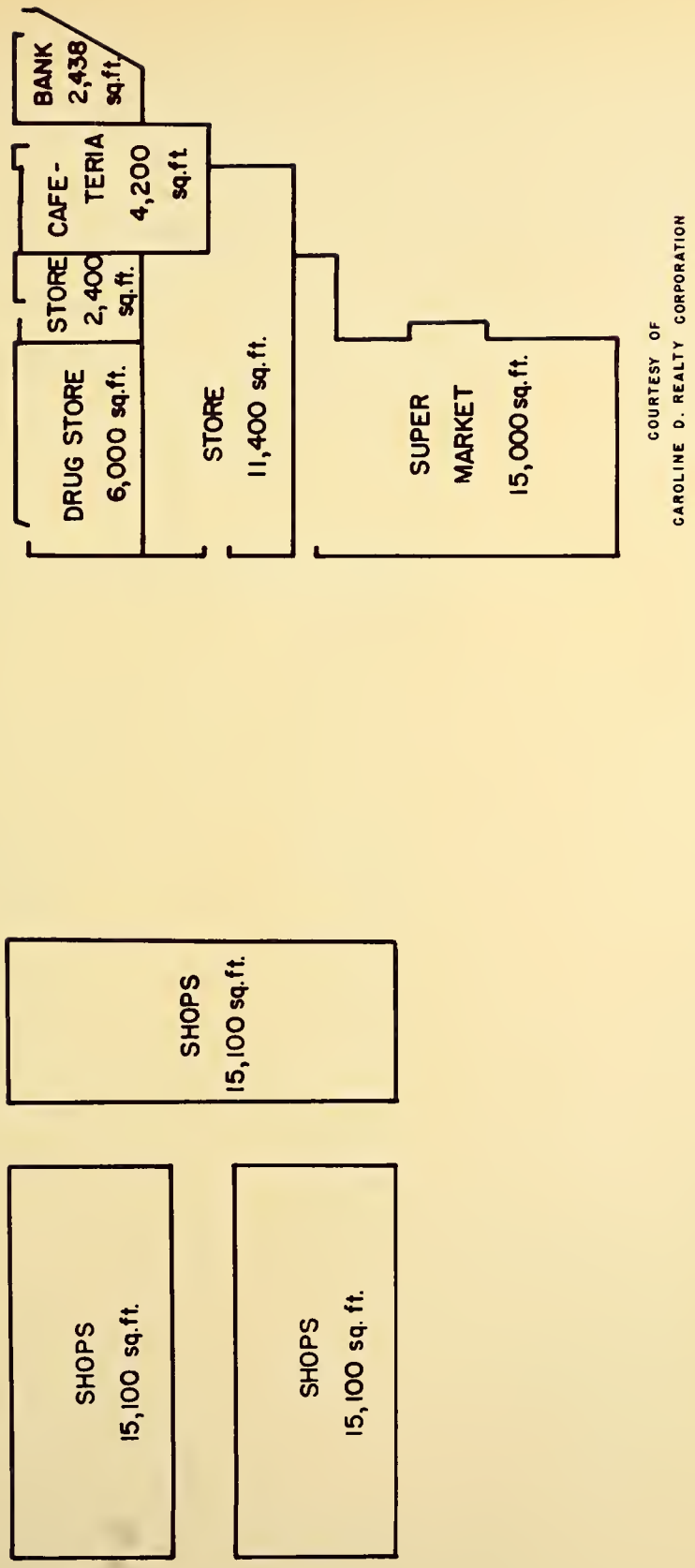


FIGURE 15 TENANCY - JEFFERSON SQUARE SHOPPING CENTER

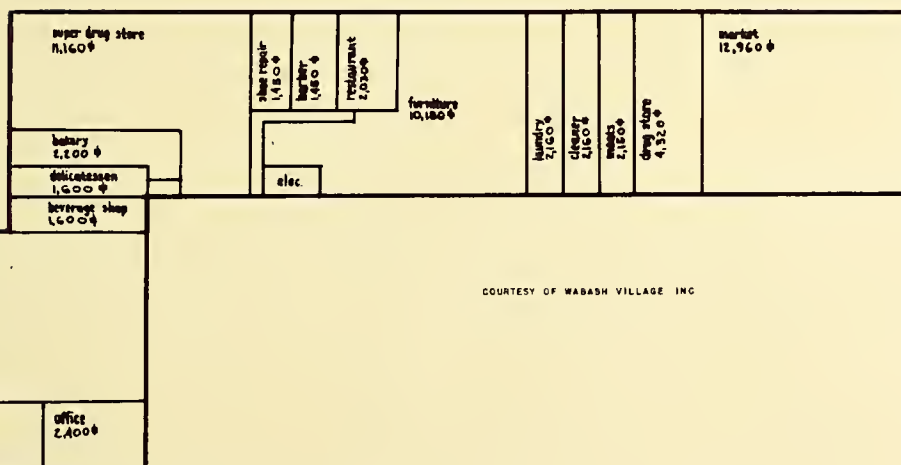
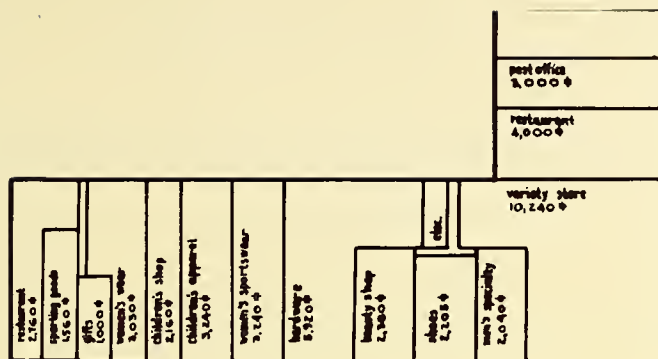


Table 10

Estimated Retail Sales Expectancy for Class of Outlets  
in Wabash Village Shopping Center (13)

Class of Outlets	Square Feet of Gross Sales Areas for Each Class of Outlet	Total Expectancy Retail Sales
<hr/>		
Shopping Goods		
Apparel	15,000	\$ 800,000
Furniture and Appliances	12,000	480,000
Variety	10,000	400,000
Other	4,000	235,000
	<hr/>	<hr/>
	41,000	\$1,915,000
 Convenience Goods		
Food	32,000	\$3,310,000
Drugstore	14,000	890,000
Restaurant	9,000	520,000
Hardware	6,000	300,000
 Services		
	10,000	220,000
	<hr/>	<hr/>
	71,000	\$5,240,000
 Institutions		
	6,000	--
	<hr/>	<hr/>
Total	118,000	\$7,155,000
<hr/>		





COURTESY OF WABASH VILLAGE INC

FIGURE 16 TENANCY — WABASH VILLAGE SHOPPING CENTER





In conclusion it should be emphasized that the success of the proposed shopping centers is almost completely dependent upon the proposed future residential construction and the increase in purchasing power rather than on the present urban and rural population.

#### Balancing the Increasing Potential in Retail Expenditures

New shopping centers cannot create new buying power. They can only attract customers from existing retailing centers or secure part of the increase in purchasing power that will accrue to the residents in fast growing suburban areas.

An increase of 4.85 percent per year is anticipated in the total effective buying income in the trade area. This percentage is derived from Figure 13.

Considering this trend to continue in the future it is estimated that the Market Square Shopping Center can effectively open for business on June 1, 1959. By this date the total effective buying income in the trade area will have increased by approximately \$9 million. By June 1, 1960 the total effective buying income in the trade area is estimated to have increased another \$3 million and on that date Jefferson Square Shopping Center is estimated to open. However, Jefferson Square can safely open for business before this estimated date of June 1, 1960 because most of the patronage will be derived from an already developed large suburban residential area bordering the site on the south. On June 1, 1962 the Wabash Village is estimated to have completed its construction and to be open for business.

During this construction and opening period of 5 to 6 years some loss in retail sales in the central business district of Lafayette is anticipated.



This loss, however, is not significant because a great number of the local stores are establishing branch stores in the shopping centers and will receive the loss occurring in the central business district as gain in the outlying centers.

In 1962, with the three shopping centers in full operation and the central business district continuing to have its normal amount of sales, the four retailing areas will have enough capacity to absorb the future increases in retail expenditure for at least 5 years. For this reason, it is believed that the Levee Shopping Center should not come into existence before the year of 1967. The primary trade area, as a whole, actually would have great enough potential to support another convenience goods center before 1967, but because the location of the levee center is in an area where population growth is not existant the center, if developed, would most likely fail. The above discussion is not meant to advocate the abandonment of the possibility of locating a shopping center at the site at some later date. The area and the site are well suited for a community type shopping center development, but the period of rapid growth is just beginning and time must pass before sufficient population is present in the area to justify such an undertaking.

#### Where Shopping Trips Originate

Analysis of the origin of customer trips not only provides valuable facts about the composition of retail expenditures but serves to define the street capacity needs in relation to the overall traffic congestion problem.

The extent to which each township within the trade area generates shopping traffic is shown in Table 11. The relative location of the



Table 11

Number of Shopping Trips per Day Made to  
Lafayette - West Lafayette in December 1963

County and Township	Code No.	Estimated 1957 Dollar Expenditures on Retail Goods in Total Trade Area Tributary to Metropolitan Lafayette		Number of Shopping Trips per Day Made to Lafayette - West Lafayette in December 1963	
		Conv.	Shop.	Conv.	Shop.
		Goods	Goods	Goods	Goods

INDIANA

Benton

Boliver	1	256,000	257,000	76	72
Center	2	-	385,000	-	108
Gilboa	3	-	67,000	-	19
Grant	4	-	154,000	-	43
Hickory Grove	5	-	69,000	-	19
Oak Grove	6	-	215,000	-	60
Parish Grove	7	-	59,000	-	17
Pine	8	-	72,000	-	20
Richland	9	-	79,000	-	22
Union	10	-	51,000	-	14
York	11	-	25,000	-	6

Boone

Center	1	-	-	-	-
Clinton	2	-	-	-	-
Eagle	3	-	-	-	-
Harrison	4	-	-	-	-
Jackson	5	-	-	-	-
Jefferson	6	-	2,000	-	1
Marion	7	-	-	-	-
Perry	8	-	-	-	-
Sugar Creek	9	-	95,000	-	27
Union	10	-	-	-	-
Washington	11	-	6,000	-	2
Worth	12	-	-	-	-

Carroll

Adams	1	-	34,000	-	10
Burlington	2	-	30,000	-	9
Carrollton	3	-	13,000	-	4
Clay	4	355,000	389,000	109	109
Deer Creek	5	35,000	74,000	10	21
Democrat	6	-	71,000	-	20
Jackson	7	-	70,000	-	20
Jefferson	8	-	51,000	-	14
Liberty	9	-	29,000	-	8



Table 11 (Continued)

County and Township	Code No.	Estimated 1957 Dollar Expenditures on Retail Goods in Total Trade Area Tributary to Metropolitan Lafayette		Number of Shopping Trips per Day Made to Lafayette - West Lafayette in December 1963	
		Conv.	Shop.	Conv.	Shop.
		Goods	Goods	Goods	Goods
Carroll (Cont'd)					
Madison	10	197,000	238,000	58	67
Monroe	11	-	26,000	-	8
Rock Creek	12	-	67,000	-	19
Tippecanoe	13	99,000	102,000	29	29
Washington	14	-	11,000	-	3
Cass					
Adams	1	-	-	-	-
Bethlehem	2	-	-	-	-
Boone	3	-	31,000	-	9
Clay	4	-	-	-	-
Clinton	5	-	74,000	-	21
Deer Creek	6	-	2,000	-	1
Eel	7	-	-	-	-
Harrison	8	-	-	-	-
Jackson	9	-	-	-	-
Jefferson	10	-	19,000	-	6
Miami	11	-	-	-	-
Noble	12	-	-	-	-
Tipton	13	-	-	-	-
Washington	14	-	-	-	-
Clinton					
Center	1	-	30,000	-	9
Forest	2	-	-	-	-
Jackson	3	-	2,000	-	1
Johnson	4	-	-	-	-
Kirklin	5	-	-	-	-
Madison	6	-	318,000	-	89
Michigan	7	-	-	-	-
Owen	8	-	67,000	-	19
Perry	9	-	97,000	-	27
Ross	10	386,000	212,000	115	56
Sugar Creek	11	-	-	-	-
Union	12	-	26,000	-	8
Warren	13	-	33,000	-	9
Washington	14	-	47,000	-	13
Fountain					
Cain	1	-	17,000	-	5
Davis	2	-	30,000	-	9





Table 11 (Continued)

County and Township	Code No.	Estimated 1957 Dollar Expenditures on Retail Goods in Total Trade Area Tributary to Metropolitan Lafayette		Number of Shopping Trips per Day Made to Lafayette - West Lafayette in December 1963	
		Conv.	Shop.	Conv.	Shop.
		Goods	Goods	Goods	Goods
Fountain (Cont'd)					
Fulton	3	-	-	-	-
Jackson	4	-	2,000	-	1
Logan	5	-	154,000	-	43
Mill Creek	6	-	2,000	-	1
Richland	7	-	46,000	-	13
Shawnee	8	-	17,000	-	5
Troy	9	-	7,000	-	2
Van Buren	10	-	49,000	-	14
Wabash	11	-	-	-	-
Howard					
Center	1	-	-	-	-
Clay	2	-	-	-	-
Ervin	3	-	11,000	-	3
Harrison	4	-	-	-	-
Honey Creek	5	-	-	-	-
Howard	6	-	-	-	-
Jackson	7	-	-	-	-
Liberty	8	-	-	-	-
Monroe	9	-	7,000	-	2
Taylor	10	-	-	-	-
Union	11	-	-	-	-
Jasper					
Barkley	1	-	47,000	-	13
Carpenter	2	-	122,000	-	34
Gillam	3	-	62,000	-	18
Hanging Grove	4	-	30,000	-	9
Jordan	5	-	25,000	-	7
Kankakee	6	-	7,000	-	2
Keener	7	-	3,000	-	1
Marion	8	-	287,000	-	80
Milroy	9	-	24,000	-	7
Newton	10	-	13,000	-	4
Union	11	-	26,000	-	8
Walker	12	-	34,000	-	10
Wheatfield	13	-	4,000	-	1
LaPorte					
Cass	1	-	1,000	-	1
Center	2	-	-	-	-



Table 11 (Continued)

County and Township	Code No.	Estimated 1957 Dollar Expenditures on Retail Goods in Total Trade Area Tributary to Metropolitan Lafayette		Number of Shopping Trips per Day Made to Lafayette - West Lafayette in December 1963	
		Conv.	Shop.	Conv.	Shop.
		Goods	Goods	Goods	Goods
LaPorte (Cont'd)					
Clinton	3	-	-	-	-
Cool Spring	4	-	-	-	-
Dawey	5	-	-	-	-
Galena	6	-	-	-	-
Hanna	7	-	-	-	-
Hudson	8	-	-	-	-
Johnson	9	-	-	-	-
Kankakee	10	-	-	-	-
Lincoln	11	-	-	-	-
Michigan	12	-	-	-	-
New Durham	13	-	-	-	-
Noble	14	-	-	-	-
Pleasant	15	-	-	-	-
Prairie	16	-	-	-	-
Scipio	17	-	-	-	-
Springfield	18	-	-	-	-
Union	19	-	-	-	-
Washington	20	-	-	-	-
Wills	21	-	-	-	-
Montgomery					
Brown	1	-	-	-	-
Clark	2	-	-	-	-
Coal Creek	3	-	154,000	-	45
Franklin	4	-	8,000	-	2
Madison	5	-	123,000	-	35
Ripley	6	-	3,000	-	1
Scott	7	-	-	-	-
Sugar Creek	8	-	43,000	-	12
Union	9	-	8,000	-	2
Walnut	10	-	-	-	-
Wayne	11	-	33,000	-	9
Newton					
Beaver	1	-	35,000	-	10
Colfax	2	-	3,000	-	1
Grant	3	-	173,000	-	48
Troquois	4	-	89,000	-	25
Jackson	5	-	28,000	-	8
Jefferson	6	-	174,000	-	49
Lake	7	-	-	-	-



Table 11 (Continued)

County and Township	Code No.	Estimated 1957 Dollar Expenditures on Retail Goods in Total Trade Area Tributary to Metropolitan Lafayette		Number of Shopping Trips per Day Made to Lafayette - West Lafayette in December 1963	
		Conv.	Shop.	Conv.	Shop.
		Goods	Goods	Goods	Goods
Newton (Cont'd)					
Lincoln	8	-	-	-	-
McClellan	9	-	-	-	-
Washington	10	-	26,000	-	8
Porter					
Boone	1	-	-	-	-
Center	2	-	62,000	-	18
Jackson	3	-	-	-	-
Liberty	4	-	-	-	-
Morgan	5	-	-	-	-
Pine	6	-	-	-	-
Pleasant	7	-	-	-	-
Portage	8	-	-	-	-
Porter	9	-	-	-	-
Union	10	-	-	-	-
Washington	11	-	-	-	-
Westchester	12	-	-	-	-
Pulaski					
Beaver	1	-	37,000	-	11
Cass	2	-	20,000	-	6
Franklin	3	-	-	-	-
Harrison	4	-	-	-	-
Indian Creek	5	-	24,000	-	7
Jefferson	6	-	19,000	-	6
Monroe	7	-	18,000	-	5
Rich Grove	8	-	10,000	-	3
Salem	9	-	123,000	-	35
Tippecanoe	10	-	-	-	-
Van Buren	11	-	8,000	-	2
White Post	12	-	91,000	-	25
Starke					
California	1	-	-	-	-
Center	2	-	-	-	-
Davis	3	-	-	-	-
Jackson	4	-	-	-	-
North Bend	5	-	9,000	-	3
Oregon	6	-	-	-	-
Railroad	7	-	-	-	-
Washington	8	-	-	-	-
Wayne	9	-	-	-	-



Table 11 (Continued)

County and Township	Code No.	Estimated 1957 Dollar Expenditures on Retail Goods in Total Trade Area Tributary to Metropolitan Lafayette		Number of Shopping Trips per Day Made to Lafayette - West Lafayette in December 1963	
		Conv.	Shop.	Conv.	Shop.
		Goods	Goods	Goods	Goods
Tippecanoe					
Fairfield	1	29,597,000	14,449,000	8,782	4029
Jackson	2	299,000	108,000	89	30
Lauramie	3	890,000	313,000	264	88
Perry	4	493,000	342,000	146	96
Randolph	5	299,000	152,000	89	43
Sheffield	6	650,000	368,000	193	103
Shelby	7	496,000	354,000	147	99
Tippecanoe	8	938,000	666,000	278	186
Union	9	402,000	306,000	119	86
Wabash	10	11,889,000	6,510,000	3528	1820
Washington	11	556,000	289,000	165	81
Wayne	12	389,000	256,000	118	72
Wea	13	579,000	451,000	172	126
Warren					
Adams	1	-	117,000	-	33
Jordan	2	-	50,000	-	14
Pont	3	-	8,000	-	2
Liberty	4	-	64,000	-	18
Medina	5	71,000	115,000	21	32
Mound	6	-	-	-	-
Pike	7	-	46,000	-	13
Pine	8	-	70,000	-	20
Prairie	9	-	73,000	-	21
Steuben	10	-	42,000	-	12
Warren	11	-	93,000	-	26
Washington	12	-	84,000	0	24
White					
Big Creek	1	51,000	125,000	15	35
Cass	2	-	24,000	-	7
Honey Creek	3	-	107,000	-	30
Jackson	4	-	18,000	-	5
Liberty	5	-	67,000	-	19
Lincoln	6	-	37,000	-	11
Monon	7	-	226,000	-	63
Prairie	8	508,000	304,000	151	85
Princeton	9	-	158,000	-	44
Round Grove	10	99,000	71,000	29	20
Union	11	-	388,000	-	108
West Point	12	-	78,000	-	22





Table 11 (Continued)

County and Township	Code No.	Estimated 1957 Dollar Expenditures on Retail Goods in Total Trade Area Tributary to Metropolitan Lafayette		Number of Shopping Trips per Day Made to Lafayette - West Lafayette in December 1963	
		Conv.	Shop.	Conv.	Shop.
		Goods	Goods	Goods	Goods
ILLINOIS					
Iroquois					
Artesia	1	-	-	-	-
Ash Grove	2	-	-	-	-
Ashkum	3	-	-	-	-
Beaver	4	-	-	-	-
Beaverville	5	-	5,000	-	2
Belmont	6	-	-	-	-
Chebanse	7	-	-	-	-
Concord	8	-	1,000	-	1
Crescent	9	-	-	-	-
Danforth	10	-	-	-	-
Douglas	11	-	-	-	-
Fountain Creek	12	-	-	-	-
Iroquois	13	-	24,000	-	7
Loda	14	-	17,000	-	5
Lovejoy	15	-	22,000	-	6
Martinton	16	-	-	-	-
Middleport	17	-	-	-	-
Milford	18	-	-	-	-
Milks Grove	19	-	-	-	-
Onarga	20	-	-	-	-
Papingau	21	-	-	-	-
Pigeon Grove	22	-	-	-	-
Prairie Green	23	-	-	-	-
Rigeland	24	-	-	-	-
Sheldon	25	-	-	-	-
Stockland	26	-	-	-	-
Vermillion					
Blount	1	-	-	-	-
Putler	2	-	-	-	-
Carroll	3	-	-	-	-
Catlin	4	-	-	-	-
Danville	5	-	-	-	-
Elwood	6	-	-	-	-
Georgetown	7	-	226,000	-	63
Grant	8	-	-	-	-
Jamaica	9	-	-	-	-
Love	10	-	-	-	-
McKendree	11	-	-	-	-



Table 11 (Continued)

County and Township	Code No.	Estimated 1957 Dollar Expenditures on Retail Goods in Total Trade Area Tributary to Metropolitan Lafayette		Number of Shopping Trips per Day Made to Lafayette - West Lafayette in December 1963	
		Conv. Goods	Shop. Goods	Conv. Goods	Shop. Goods
Vermilion (Cont'd)					
Middlefork	12	-	51,000	-	14
Newell	13	-	-	-	-
Oakwood	14	-	-	-	-
Pilot	15	-	27,000	-	8
Ross	16	-	-	-	-
Sidell	17	-	-	-	-
South Ross	18	-	-	-	-
Vance	19	-	-	-	-



townships within the trade area identified by the code number in Table 11, column 2, is shown on Figure 10. Tippecanoe County is clearly the area of greatest trip generation, accounting for 86 percent of all the trip origins in the trade area.

The number of shopping trips generated in Fairfield and Wabash townships in Tippecanoe County is shown in Table 12. Figure 17 shows these two townships broken down into zones identified by code numbers corresponding to code numbers in Table 12, column 2.

The majority of shoppers go downtown directly from home, but many come from work or are attracted to the central business district for other reasons. Since downtown employment and variety of attractions are limited in Lafayette, the effect of these two generators of retail business is comparatively minor. It is then estimated that 95 percent of all shoppers come directly from home, and only 5 percent or so visit stores from work.

The level of retail activity in shopping goods line fluctuates from month to month, attaining its maximum during the period prior to Christmas when the non-shopper traffic is at its seasonal minimum. It is on this pre-Christmas shopping season that these figures on shopping goods trips in Tables 11 and 12 in this study have been based. Figure 18 shows the fluctuation in shopping goods sales in a typical year by month.

For convenience goods it was estimated that 9.0 percent of total yearly sales in the convenience goods line would occur during the month of December.

The average amount spent per trip by a shopping goods shopper was estimated at \$15. Usually this figure is somewhat less during the after Christmas season. The average amount spent per trip by a convenience goods shopper was estimated at \$4.55. "This Weeks Magazine's" 6th



Table 12

Number of Shopping Trips per Day Originating in Metropolitan  
Lafayette in December 1963

Shopping Trips			Shopping Trips		
Zone Numbers	Convenience Goods	Shopping Goods	Zone Numbers	Convenience Goods	Shopping Goods
1	4	2	50	17	8
2	-	-	51	173	79
3	52	27	52	178	82
4	483	243	53	113	52
5	194	100	54	9	4
6	101	52	55	628	295
7	-	-	56	10	5
8	116	76	57	65	30
9	89	73	58	190	87
10	141	72	59	369	159
11	298	217	60	245	112
12	196	138	61	303	139
13	-	-	62	120	55
14	201	104	63	239	110
15	122	63	64	14	6
16	271	143	65	2	1
17	4	2	66	270	124
18	49	25	67	1	1
19	278	143	68	327	150
20	-	-	69	215	98
21	126	65	70	304	140
22	-	-	71	152	70
23	-	-	72	179	82
24	-	-	73	110	50
30	126	58	74	156	72
31	176	81	75	101	46
32	5	2	76	346	159
33	271	124	77	20	9
34	243	112	78	-	-
35	17	8	79	5	2
36	13	6	80	3	1
37	-	-	100	789	262
38	12	5	110	12	8
39	366	168	200	9	4
40	414	190	210	76	35
41	369	169	220	10	5
42	320	147	230	0	1
43	1	1	240	2	1
44	-	-	250	53	24
45	432	198	260	337	155
46	423	194	270	221	101
47	8	4	280	13	6
48	3	2			
49	-	-			
			Total Trips	12,310	5,849





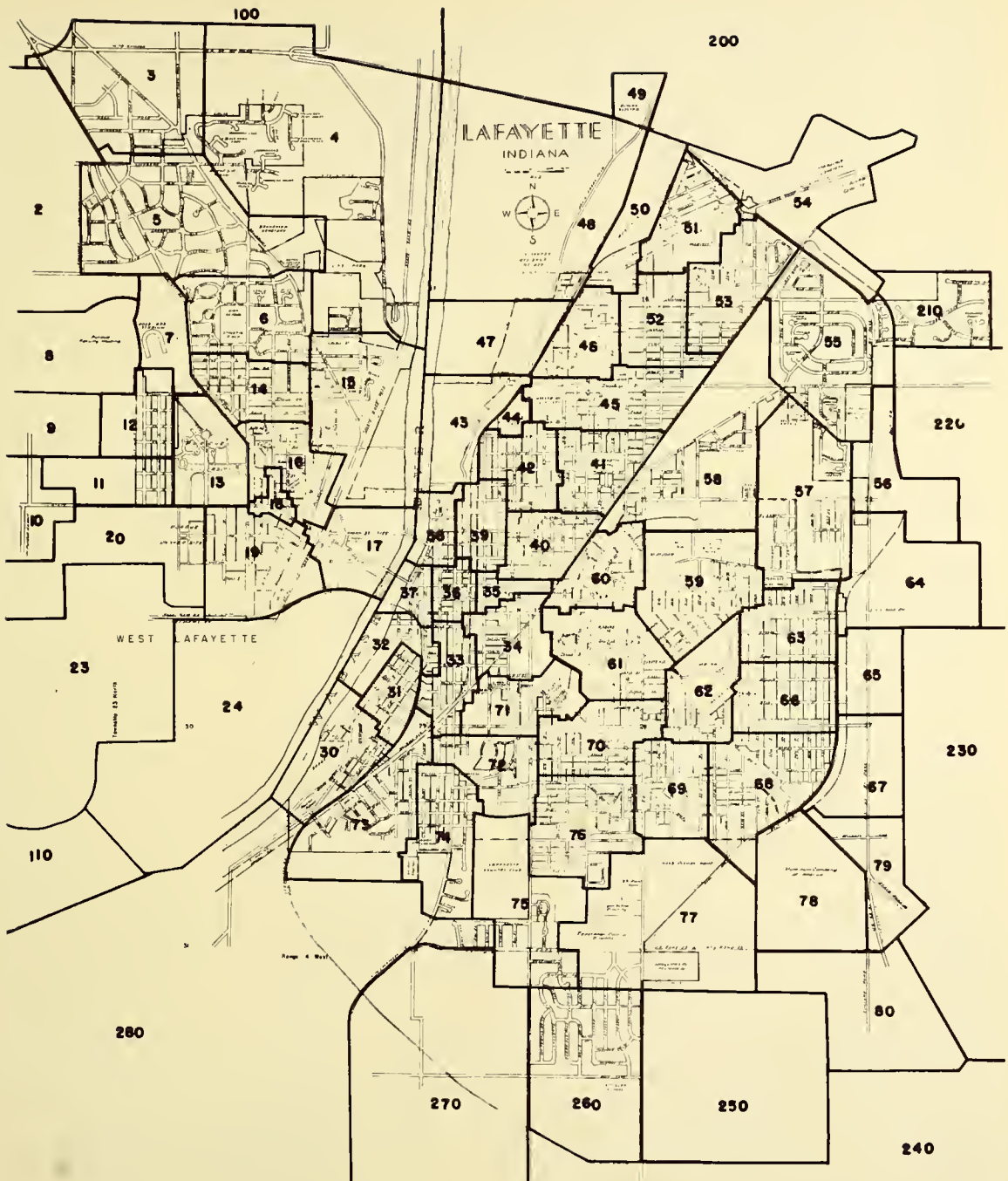


FIGURE 17 ZONE BOUNDARIES OF  
FAIRFIELD AND WABASH TOWNSHIPS



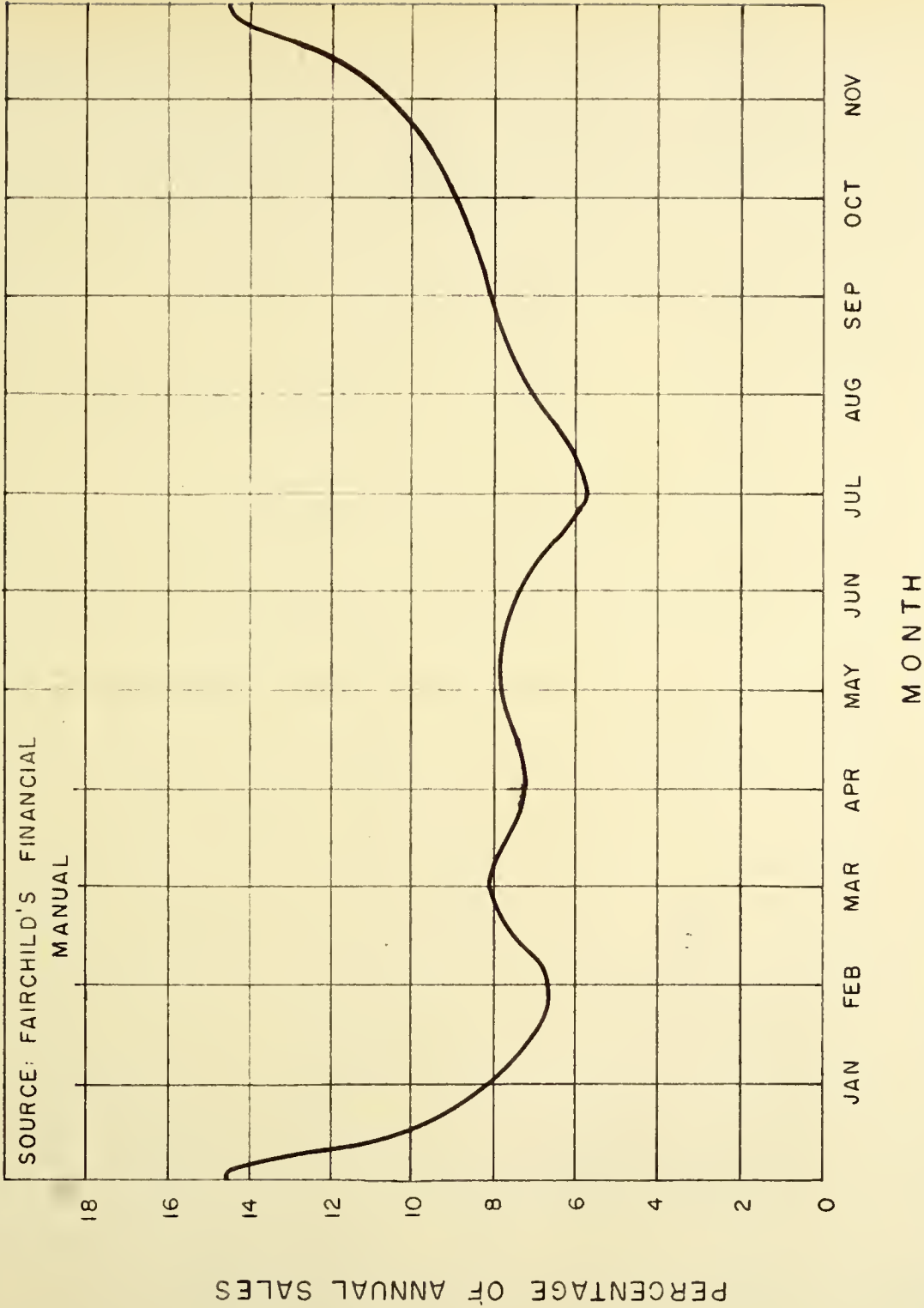


FIGURE 18 SHOPPING GOODS SALES IN A YEAR BY MONTH



Biennial Grocery Store study, 1956, reveals that the average customers purchase amounted to \$6.83. This figure is for groceries only and does not include drugstore items.

In the convenience goods line, food and drug store items amount to 39 percent of total expenditures for convenience goods. It is believed that trips for services available on the shopping center site are made along with the trips for convenience goods. For this reason the number of shopping trips for convenience goods in Tables 11 and 12 is estimated for food and drug store items only.

In general, in a regional or community shopping center, shopping goods customers and convenience-goods customers, at any time, are two distinguishable groups. For example, the housewife who comes to do her weekly marketing is not--at that time--an apparel buyer. Therefore, the estimated number of convenience goods trips are not combined with estimated shopping goods trips to make a combined convenience and shopping goods trip.

Highway Research Board studies and other research indicate that from 80 percent to 90 percent of retail purchases both in central business district and in the suburbs are made by women. Recent research also indicates that about one out of every two persons entering a store buys something. The results of the comprehensive origin and destination traffic survey performed in Lafayette-West Lafayette in 1952 indicate that the average occupancy per automobile for the purpose of shopping is two. It is then assumed in this report that automobile occupancy has no effect on the amount of purchases made.

Finally, the number of shopping trips per zone, either for shopping goods items or convenience goods, was estimated by translating the estimated annual retail expenditures tributary to Metropolitan Lafayette into daily



automobile trips by taking into consideration all the previously mentioned factors.





## STREET TRAFFIC CHARACTERISTICS

### Investigations

Having determined the origin of all shopping trips in the trade area, the assignment of vehicles to the specific road net surrounding the three proposed shopping centers was somewhat time consuming and required an investigation of existing and future traffic flow conditions.

As a basis for the traffic analysis for the three proposed shopping centers, the various highways and streets serving the proposed sites were inspected for type of abutting land use, speed of travel, existence of interferences, ease of improvements, and similar characteristics.

All dimensions of intersections and streets considered essential were taken at predetermined critical locations, while data on some aspects were obtained from the city engineers office.

A thorough program of street traffic volume counting was prepared and executed without having to divert from the original plan. In order to obtain a fairly accurate estimate of yearly traffic increase, traffic was counted for a three week period in March 1957 on all three Wabash River bridges. By adjusting the figures for seasonal variations, whether as rural highways or city streets, the yearly increase for the city streets was estimated at 4.1 percent per year. The increase in traffic on the U. S. 52 Bypass was estimated to have occurred at the rate of 5 percent per year. Assuming, then, that traffic on Lafayette's streets will increase at the rate of 4 percent per year and traffic on U. S. 52 Bypass



at the rate of 5 percent per year, the figures were used in this report to arrive at predicted future traffic volumes.

In order to obtain a true picture of existing traffic conditions around the proposed shopping center sites an automatic recording traffic counter was set up in a location considered most representative of the area traffic characteristics. This count was obtained for a full 7 day week with traffic counted, summarized, and printed automatically by the counter after every 15 minute interval. This traffic counter was supplemented by two other automatic recording counters and two "junior" accumulative non-recording traffic counters. These four other counters were used to make one full day counts at different locations in the vicinity. All counters were checked twice a day and all situations causing an error in the counts were quickly eliminated. Later in the office, all one day counts were analyzed together with the 7 day master count and one day traffic counts related to the 7 day master count. Because the month of May is considered to be the season of the year when the traffic is at its yearly average, no seasonal factor of any kind was applied to the traffic volume counts.

In addition to all the mechanical traffic counts, traffic at selected intersections was counted manually during peak hour periods from 4:00 to 6:00 P.M. Information on turning movements, percentage of commercial vehicles, and directional distribution of travel were obtained. These two hour counts, thus, at some places were used to arrive at 24 hour figures by application of certain factors derived from the count at the master station or another count taken nearby, considered having similar volume characteristics.

During this traffic counting period no activity occurred which might



have caused traffic volumes to be extraordinarily low or high. Therefore, considering all the factors discussed previously, all traffic counts in the vicinity of the proposed shopping center sites are considered to be accurate for the purpose of this study.

Various highway and city planning agencies were consulted to learn what highway improvements relating to the centers or the metropolitan area as a whole are contemplated in the future.

The major highway improvement anticipated in the near future is the construction of the fourth bridge across the Wabash River. The Indiana State Highway Department has now completed approximately 75 percent of the plans for the proposed new bridge over the Wabash. This bridge will be located between Salem Street and Union Street in Lafayette joining Fowler Avenue and Wiggins Street in West Lafayette as one directional approaches. Off and on ramps from Lafayette side to North River Road are provided with the bridge over passing North River Road. This new bridge is expected to be completed within the next three to five years. In the estimation of future traffic volumes and assigning shopping traffic to a specific road-net, the bridge was considered to be in full operation for a number of years.

After passage of the Federal Interstate Highway Act of 1956, plans are now being formulated by the State Highway Department for a new location for the U. S. 52 Bypass. It is anticipated that within the next five or ten years the U. S. 52 Bypass will be relocated and developed as a high-type limited access highway. With the advent of the new bypass some 50 to 60 percent of the traffic now using U. S. 52 Bypass will be diverted to the new location, offering appreciable relief to this existing highway.

Some minor highway and street improvements are anticipated in West



Lafayette. The Master Plan of 1953 indicates that several of the local streets especially in the northern part of town are to be widened and improved otherwise. With the tremendous growth of population taking place on both sides of the bypass in the northern part of West Lafayette, County Farm Road is planned as a major arterial of four lanes with a possibility for additional lanes as the demand arises. The Wabash Village Shopping Center would benefit greatly from this improvement since it is located at the southeast sector of U. S. 52 Bypass and the County Farm Road.

Some street improvements are planned along Earl Avenue and 9th Street in the southern part of the city of Lafayette. A large portion of Lafayette's growth in population in the past years has been in the south. A large portion of the anticipated growth for Lafayette will be south since the major undeveloped tracts of land adjacent to the city are south. The largest home developer in Lafayette has already made preliminary plans to develop a large portion of this land.

A study conducted at Purdue University reveals that population north of the U. S. 52 Bypass in West Lafayette may be 6,310 in the year of 1985. An additional 2,570 people may develop homes in addition to those already in existence in the area south of the bypass by 1985. In this report a large percentage of this increase both north and south of the bypass is assumed to have occurred by the year of 1963.

#### Traffic for the Purpose of Shopping

In the section entitled, "Economic Analysis", the number of trips made for the purpose of shopping was estimated for each township in each county in the trade area.

In assigning these shopping trips generated in the residential areas





to a specific retailing facility a number of assumptions had to be made. It was assumed that all the improvements discussed previously had taken place, the population increases had occurred as predicted, vehicular traffic on city streets had increased as estimated, and no major retailing facilities outside of the three shopping centers had been developed. It was also assumed that the central business district of Lafayette had suffered no loss due to the construction of the shopping centers and it continued to sell goods at the capacity estimated in 1957 expressed in number of square feet of floor area devoted to different kinds of retail goods.

The number of square feet of floor area devoted to retailing in the central business district of Lafayette was estimated. The floor area was measured off the Sanborn Maps obtained from the Metropolitan Area Traffic Survey Unit of the Indiana State Highway Department. Because the information obtained from the maps was of 1953 origin and the map did not indicate what type of retailing facilities were there in Lafayette, a field check was made. Two persons made the check. One drove a car on a predetermined route in the central business district and the other marked on forms, prepared specially for this occasion, the type of store and any other changes that had occurred since 1953. This information was later checked against figures presented in the Sales Management, Survey of Buying Power and revealed a close correlation between the two sources of information.

In order to be able to assign traffic created by the sale of convenience goods, a grocery store survey in the Lafayette Metropolitan Area was conducted. All of the grocery stores listed in the telephone book were located on the Sanborn Maps and the gross floor area determined. The



grocery stores not located on the Sanborn Maps were contacted by telephone and information was obtained in this manner. These findings were again checked against the figures presented in the Sales Management, the Survey of Buying Power, and a close correlation existed between the two sources of information.

The assigning of the generated convenience goods trips consisted of two parts. Trips generated within the city were assigned to convenience goods retailing centers within 6 minutes driving time percentage wise according to the number of square feet of retailing floor area available. For instance, from one zone twice as many trips were assigned to a retailing center that had twice as much floor space area than the other not considering driving time within 6 minute radius. Trips originating outside the Metropolitan area, that had a considerable distance to drive were assigned percentage wise to a number of retailing facilities in the direction of approach.

A fairly similar method was employed in assigning shopping goods trips. The following retailing facilities were considered as drawing powers of generated trips: the central business district of Lafayette, the levee retailing area of West Lafayette including the village business section centered around Northwestern Avenue and State Street, Mar-Jean Village, and the three proposed shopping centers. Trips outside the metropolitan area were assigned percentage wise according to the number of square feet devoted to retailing of shopping goods. A judgment method of assigning was employed in a situation when a trip had to pass close to a retailing facility to go to another. A greater percentage was assigned to the first retailing facility than to the other. It is believed that very few people pass a shopping center on their way shopping in order



that they may shop in another farther away of equal size and selection. All shopping trips generated in the metropolitan area for the purpose of shopping goods were assigned to the retailing facilities percentage wise according to floor area devoted to shopping goods. Again the theory of not passing a shopping center to go to another farther away was assumed whereby a greater percentage of trips were assigned to the first retailing facility than it originally warranted.

The Reilly's Law of Retail Gravitation could have been used in assigning shopping goods trips to the retailing facilities. It was not used because the distance or the driving time difference between the retailing facilities in Metropolitan Lafayette is so small it would not give accurate estimations. It is believed that this percentage method of assigning traffic has been accurate in application to this study.

#### Shopping Center Traffic Characteristics

Market Square Shopping Center. From the standpoint of accessibility to vehicular traffic, the Market Square Shopping Center site is ideally located. Access to the site is provided along two minor arterial streets, namely Greenbush and Elmwood. Through traffic movement on these streets is very light and is local in character in that these streets act as distributors for the neighborhood. It is highly unlikely that these streets will develop as major arteries and consequently through traffic movement will remain relatively light. With a minimum of through traffic, ample capacity can be provided for the maneuvering of shopper traffic into and out of the center. Less than half a mile east of the site is a major highway--U. S. 52 Bypass--which is scheduled for relocation. The existing facility will then become a major city thoroughfare with ample capacity.



The existing bypass is linked with other major highways in the trade area and acts as a high-type traffic facility carrying patrons to the site. The new bridge across the Wabash River will provide easy access to the site from West Lafayette and points west of the river. A great number of patrons were estimated to approach the center via this bridge. Figure 19 shows the shopping center site with high density residential area in the foreground.

It is believed that by 1963 the automobile ownership will have become so universal that all trips made for the purpose of shopping will be done by driving the automobile to the site. For this reason it is believed that walk-in trade will constitute a very minor part of the total patronage of the center and is completely ignored in this study.

Having established the proportion of patronage that will use private transportation in traveling to the Market Square Shopping Center, the traffic analysis further involved analyzing the present traffic using the highways serving the center. Figure 20 shows the existing 1957 average annual daily traffic flows in the vicinity of the site. These volumes were obtained from the counts taken in that vicinity as discussed previously. From the 1957 traffic flow map and observations during the counting period it was concluded that no major traffic problems occur in the vicinity at the present time.

The existing traffic counts and anticipated developments in the future served as the basis for forecasting the future volumes of non-shopping traffic in the vicinity. Figure 21 shows the estimated 1963 average annual daily traffic flow on the streets in the vicinity of the shopping center. Some congestion is anticipated at the intersection of Union and 18th Streets. As shown in Figure 21 it was assumed that the new bypass

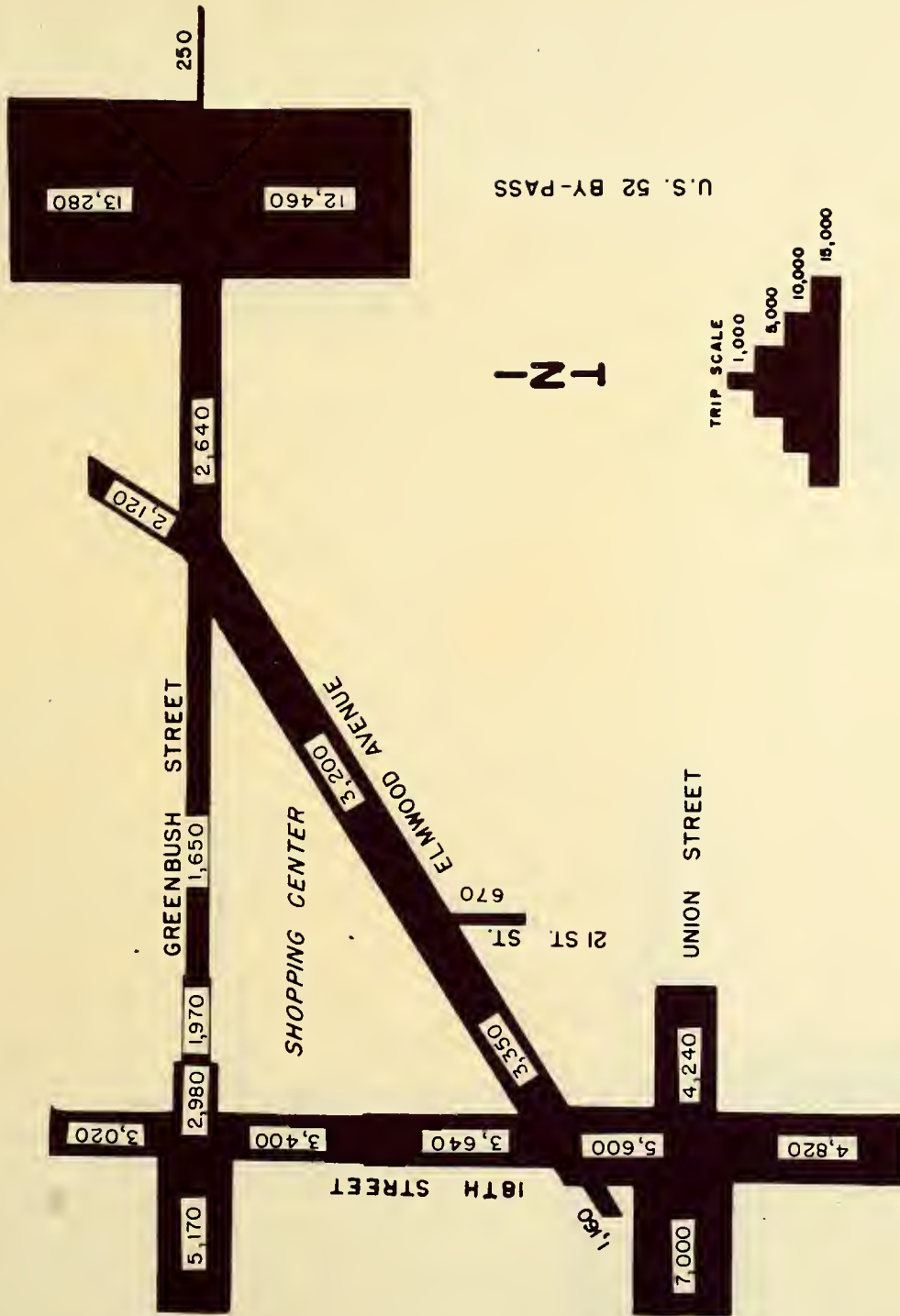






Figure 19 The Site for Market Square Shopping Center





**FIGURE 20 1957 AVERAGE ANNUAL DAILY TRAFFIC FLOW  
IN THE VICINITY OF MARKET SQUARE**



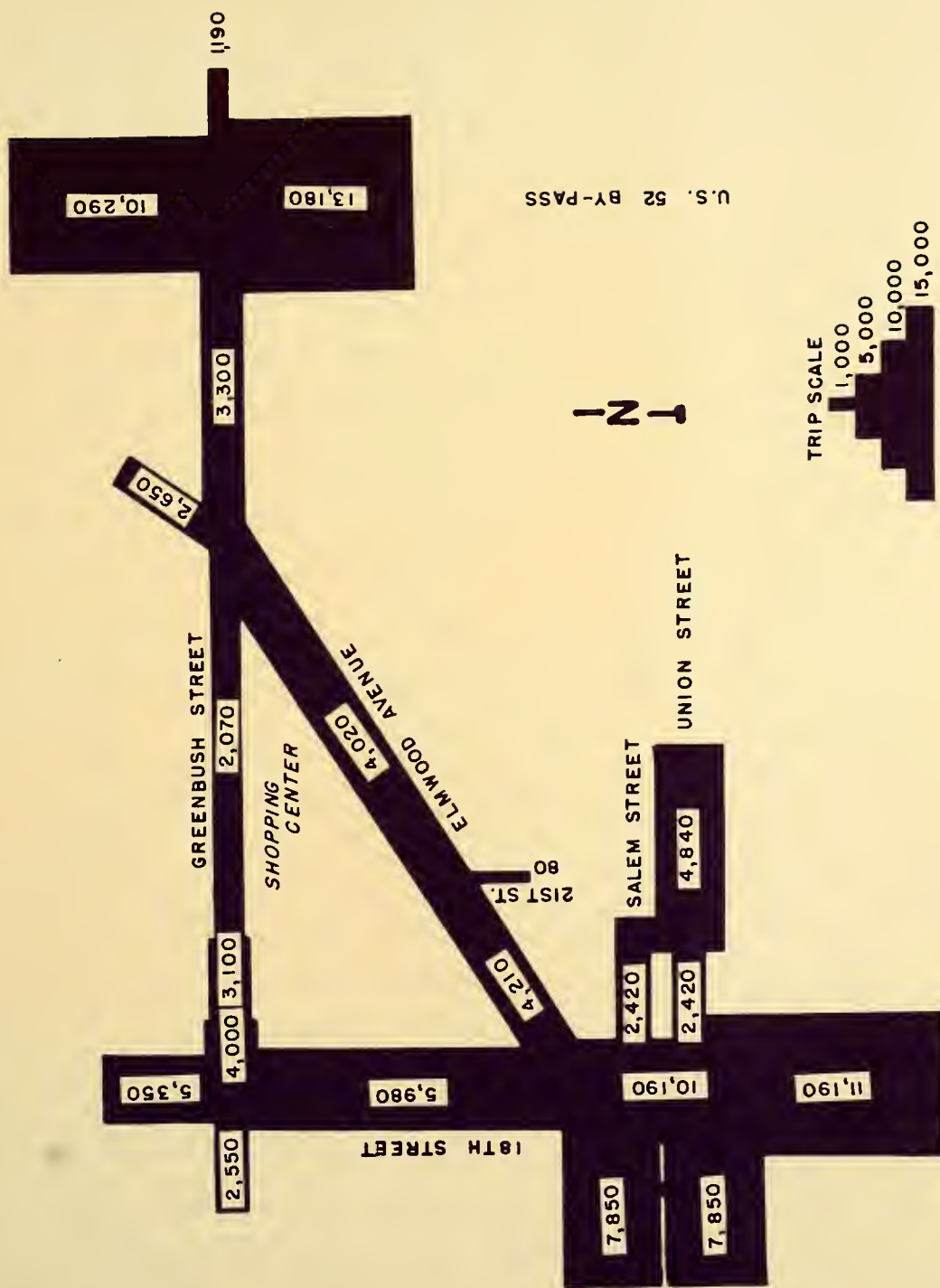


FIGURE 21 ESTIMATED 1963 AVERAGE ANNUAL DAILY TRAFFIC FLOW IN THE VICINITY OF MARKET SQUARE



had not been completed as yet and traffic had increased on the existing facility at a normal expected rate.

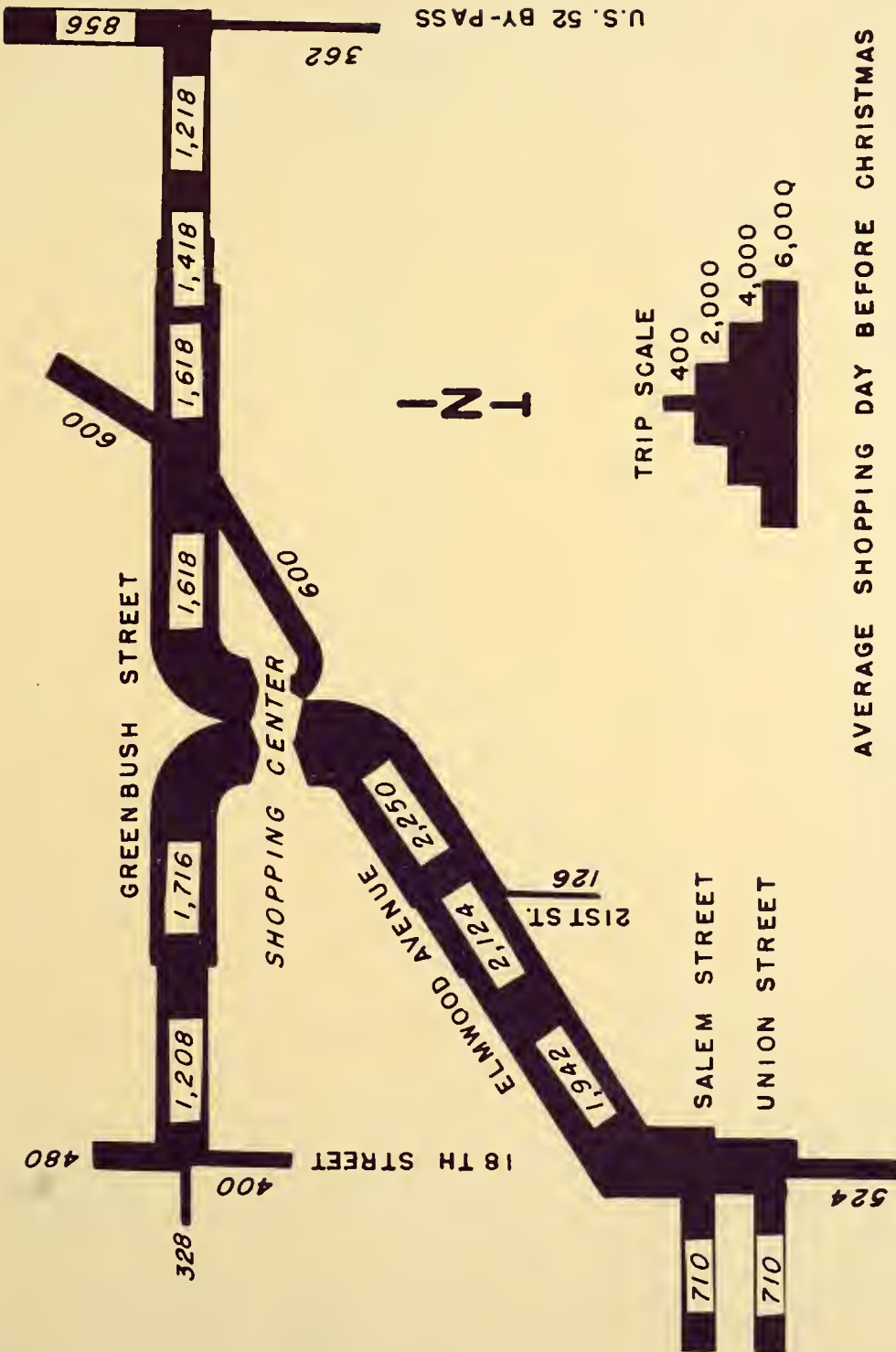
After establishing values for all traffic that would exist without the shopping center, the volumes for shopping traffic were estimated and are shown pictorially on Figure 22. This figure shows the estimated number of shopping trips to and from the shopping center within an average day during the pre-Christmas shopping season in December of 1963. The predominant direction of the flow of shopper traffic is from the west with the bypass contributing to a great extent.

The quantity of traffic moving in and out of the shopping center varies greatly from hour to hour, day to day, and month to month. The days of the week producing the greatest movement normally are Monday and Friday, presuming that the stores stay open in the evenings on these days. The hourly peaks take the form of an outbound movement from 5:00 to 6:00 P.M. on the days when the stores close early, an inbound movement toward the shopping center from 7:00 to 8:00 P.M. when the stores are open in the evenings, and an outbound movement from 8:30 to 9:30 P.M. when the stores close at 9:30 P.M. The hourly fluctuation pattern for shopping centers in general is shown graphically on Figures 23 and 24. Figure 23 shows the hourly fluctuation pattern of traffic to and from a shopping center where stores are closed at 6:00 P.M. The hourly fluctuation pattern from late traffic is shown graphically on Figure 24 where stores are scheduled to close at 9:30 P.M.

The day to day fluctuation of shopper traffic at a center is shown on Figure 25. Monday and Friday are the days of greatest traffic movement because it is assumed that stores stay open late on these days. The figures on shopper traffic to be presented later on are for the average







AVERAGE SHOPPING DAY BEFORE CHRISTMAS 1963

FIGURE 22 ESTIMATED VOLUME OF SHOPPER TRAFFIC PER DAY IN DECEMBER 1963



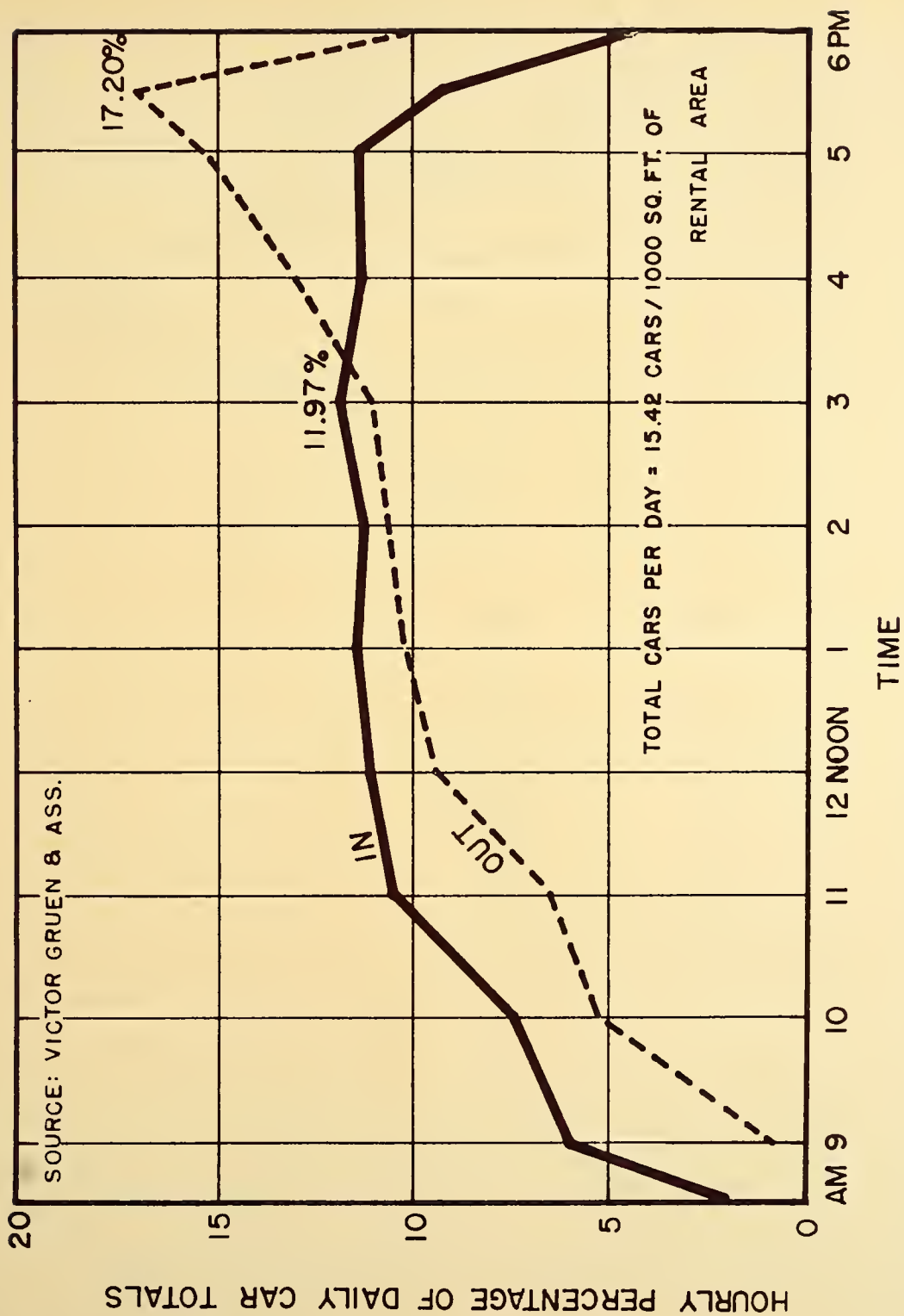


FIGURE 23 HOURLY FLUCTUATION PATTERN — EARLY TRAFFIC



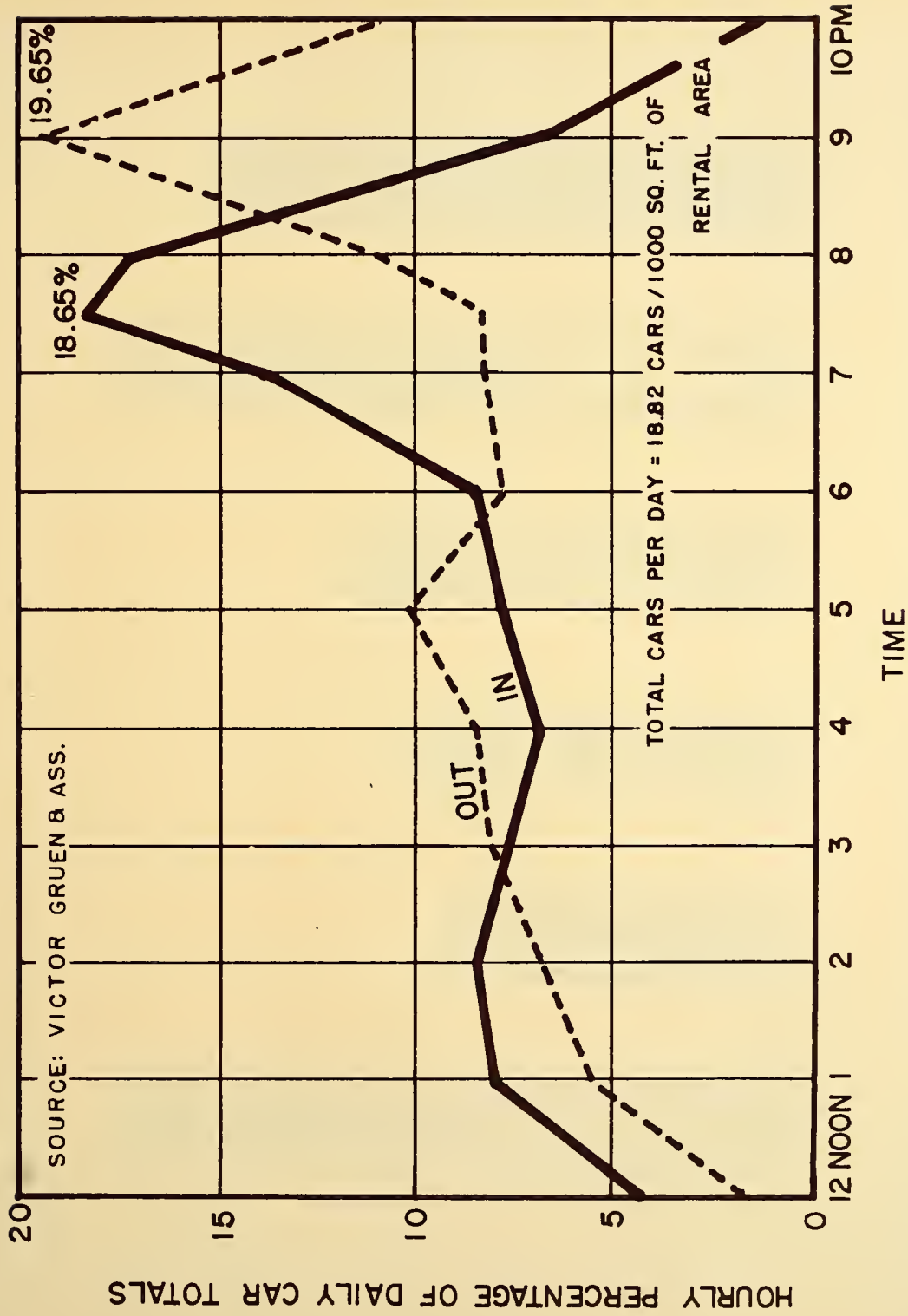


FIGURE 24 HOURLY FLUCTUATION PATTERN — LATE TRAFFIC



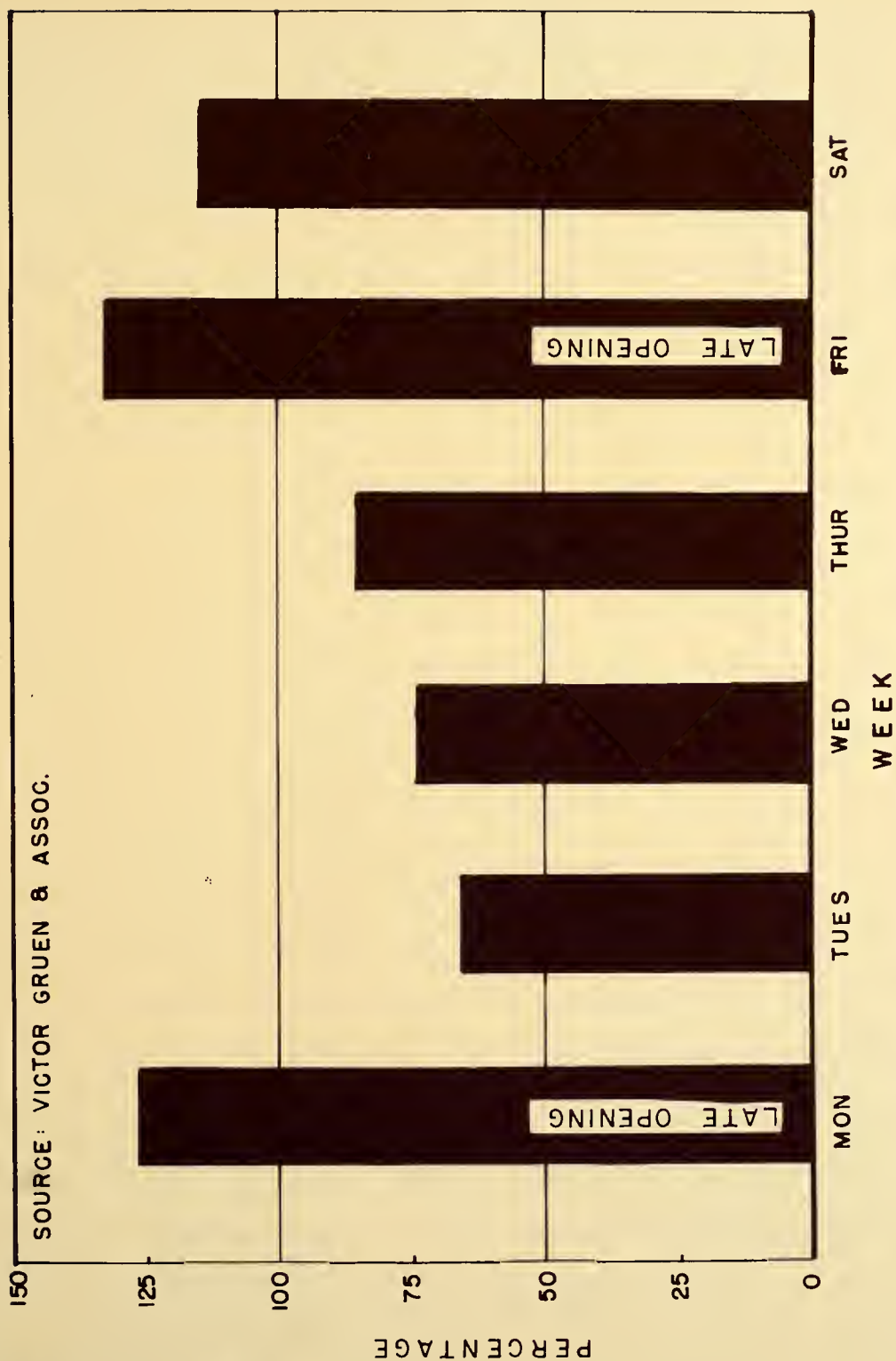


FIGURE 25 AVERAGE NUMBER OF TRIPS PER DAY TO A SHOPPING CENTER EXPRESSED AS PERCENTAGE OF AVERAGE WEEKDAY





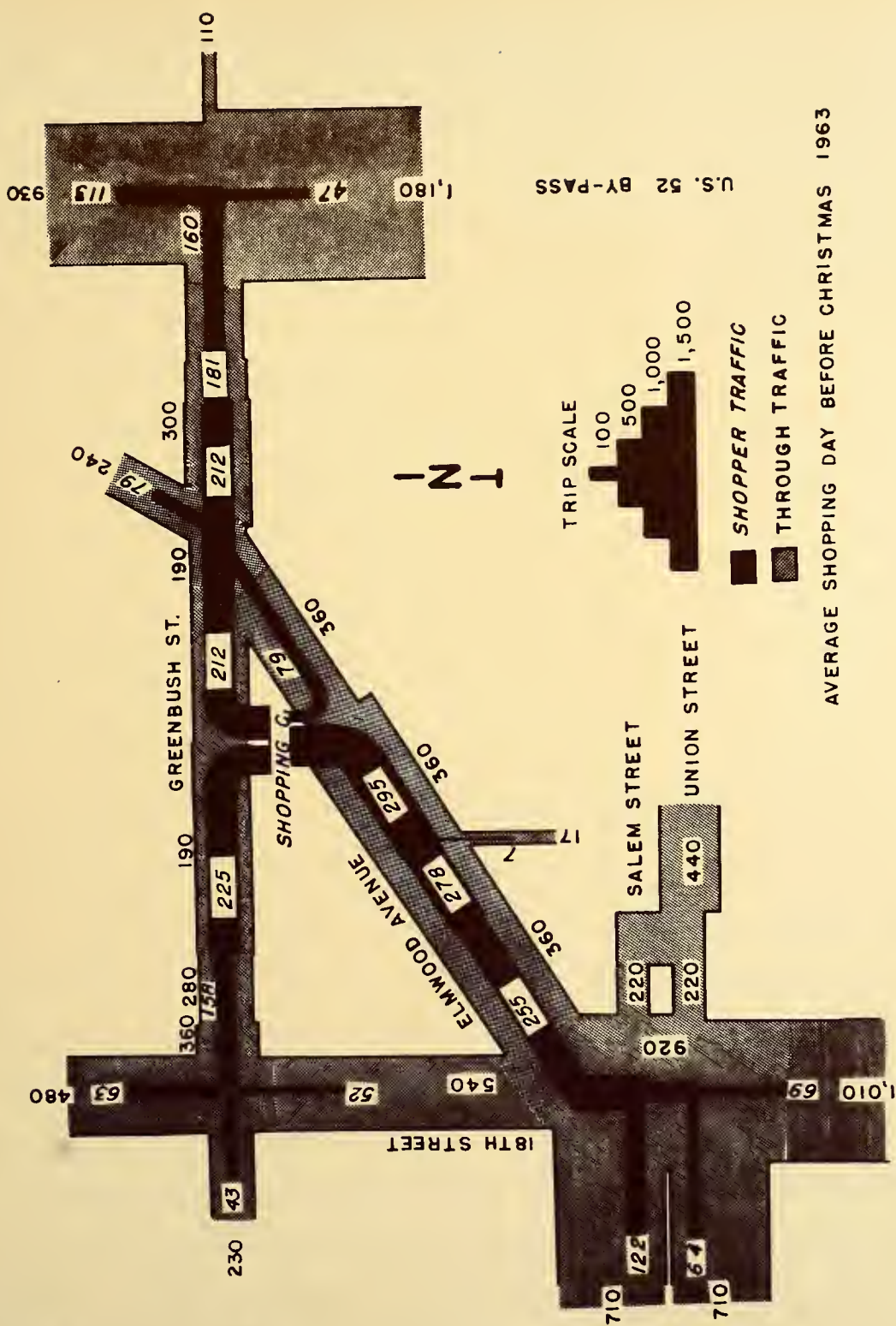
day of the week or at the 100 percent line on Figure 25.

The afternoon peak hour movement in the vicinity of Market Square was found to be from 5:00 to 6:00 P.M. with 70-30 percent directional distribution existing on Elmwood Avenue. The 70 percent portion of traffic was moving in the north easterly direction. As a consequence the peak loads in shopper traffic during the days of early closing occur between 5:00 and 6:00 P.M. corresponding to the afternoon peak hour worker movement. For this reason it was found necessary to study the peak hour movement of both shopper and non-shopper traffic in the vicinity of the shopping center.

Figure 26 shows the estimated December 1963 peak hour traffic flow in the vicinity of Market Square. More than 50 percent of the total traffic on Greenbush Street is shopper traffic. Shopper traffic on Elmwood between 21st Street and the entrance to the center constitute 48 percent of the total traffic. Between 5:00 and 6:00 P.M. the peak shopping traffic flow is outbound from the shopping center. During this hour there are an estimated 148 vehicles leaving the center desiring to travel west on Greenbush. These vehicles are forced to cross one lane of eastbound traffic, 130 vehicles per hour, and merge with traffic moving west. To relieve congestion at this point it is recommended that Greenbush Street be widened along the entrance to the shopping center and channalization provided to allow one lane of free movement in each direction while providing a storage area for vehicles turning left into the shopping center. At the same time it provides a safety zone for vehicles that have come out of the parking lot onto the highway traveling west.

On Elmwood Avenue during the peak hour there are an estimated 100 vehicles coming from the southwest on Elmwood desiring to turn into the







center. At the same time there are 250 vehicles that are traveling in the same direction not desiring to enter the center. If one lane of traffic in each direction should accommodate all this traffic, considerable congestion would occur. It is thus recommended that Elmwood Avenue be widened to a minimum of 44 feet to allow two lanes of movement in each direction. Two lanes are desirable in that one lane can be used for storing vehicles attempting to turn into the shopping center, while the other lanes provide uninterrupted movement for through traffic not destined to the shopping center.

Shopper traffic amounts to 35 percent of total traffic through the intersection of Elmwood Avenue and Greenbush Street during the peak hour. Because of high traffic volumes at this intersection, it is recommended that the stop signs be eliminated and replaced with traffic signals. This change in traffic operations would permit efficient movement and provide more capacity.

At the intersection of Greenbush Street and U. S. 52 Bypass a traffic signal is assumed to be in operation. No congestion as a result of shopper traffic is anticipated at this intersection.

Because of the heavy traffic volumes at the intersections of 18th Street with Salem Street and Union Street it is assumed that sufficient traffic operational measures will have been applied to handle the rising demand. Shopper traffic constitutes only a minor part of the overall traffic at these locations.

Jefferson Square Shopping Center. From the standpoint of accessibility to vehicular traffic, the Jefferson Square Shopping Center is also ideally located. Access to the site is provided along an arterial street, namely Earl Avenue, and along a residential street, Winthrop Avenue. Through





traffic movement on Earl Avenue is light and is local in character in that this street acts as a distributor for the large neighborhood surrounding the shopping center site. It is highly unlikely that this street will develop into a major highway and consequently through traffic movement will remain relatively light. With a minimum of through traffic, ample capacity can be provided for the maneuvering of shopper traffic into and out of the center. About three blocks to each side of the shopping center there exist two arterial streets namely, 9th Street and 18th Street. These two arterial streets extend far north and south across Earl Avenue and provide good access to the site. Figure 27 shows the shopping center site with part of the large residential development in the foreground.

Because the shopping center is located in an area surrounded by a residential development, it is estimated that an appreciable percent of patrons arriving at the shopping center will arrive by walking. During the pre-Christmas season when the walk-in trade is at its minimum, it is assumed that all patrons will arrive by automobile.

Anticipated developments in the future together with the existing traffic counts served as the basis for forecasting the future volumes of non-shopper traffic in the vicinity. Figure 28 shows the existing 1957 average annual daily traffic flow in the vicinity of the site. These volumes were derived from the counts taken in that vicinity as discussed in the previous chapters. Assuming that considerable residential expansion will take place in the vicinity and that traffic will increase at the normal expected rate, the traffic flow for the year of 1963 if the shopping center was not there was estimated and is shown in Figure 29.

By the year of 1963, traffic volumes at the intersection of Earl Avenue and 18th Street will have become great enough to warrant installing





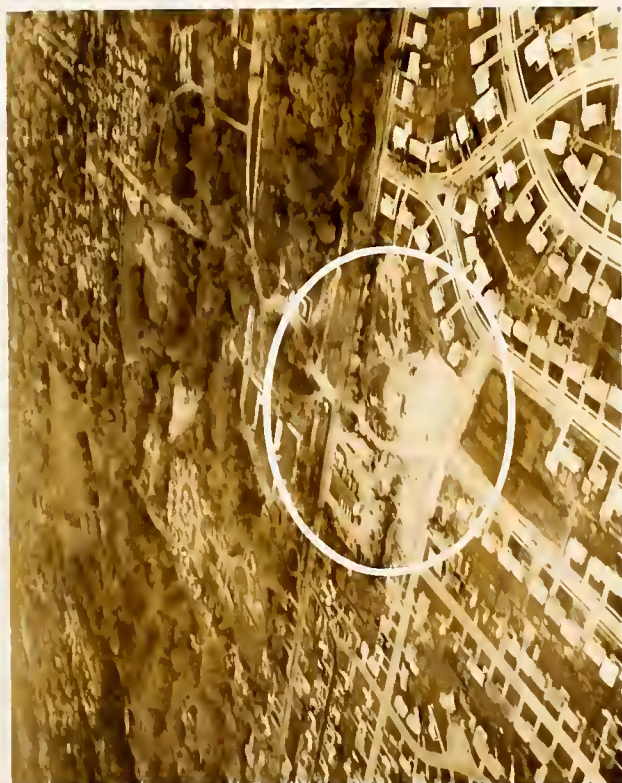


Figure 27 The Site for Jefferson Square Shopping Center



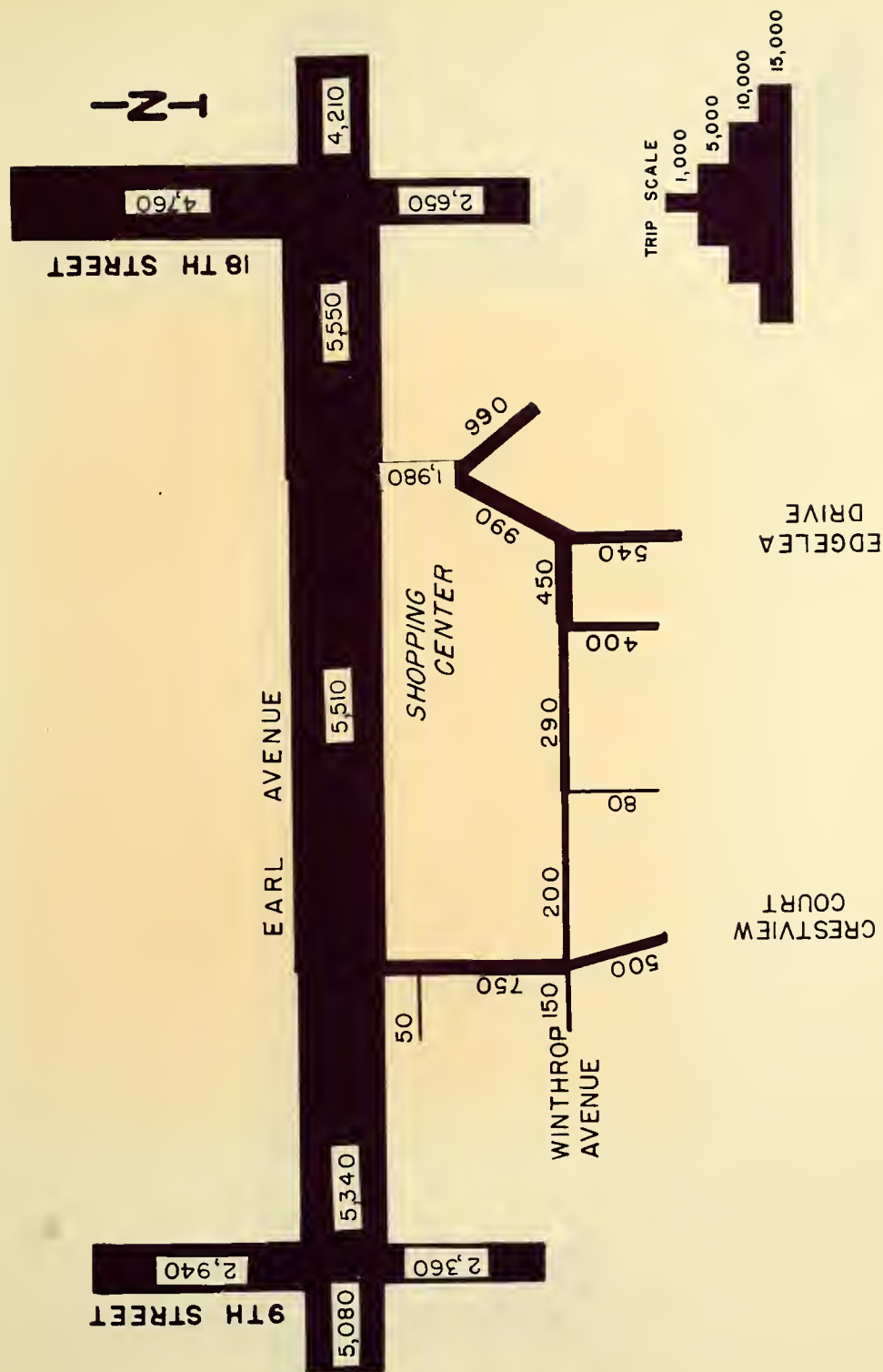


FIGURE 28 1957 AVERAGE ANNUAL DAILY TRAFFIC FLOW  
IN THE VICINITY OF JEFFERSON SQUARE



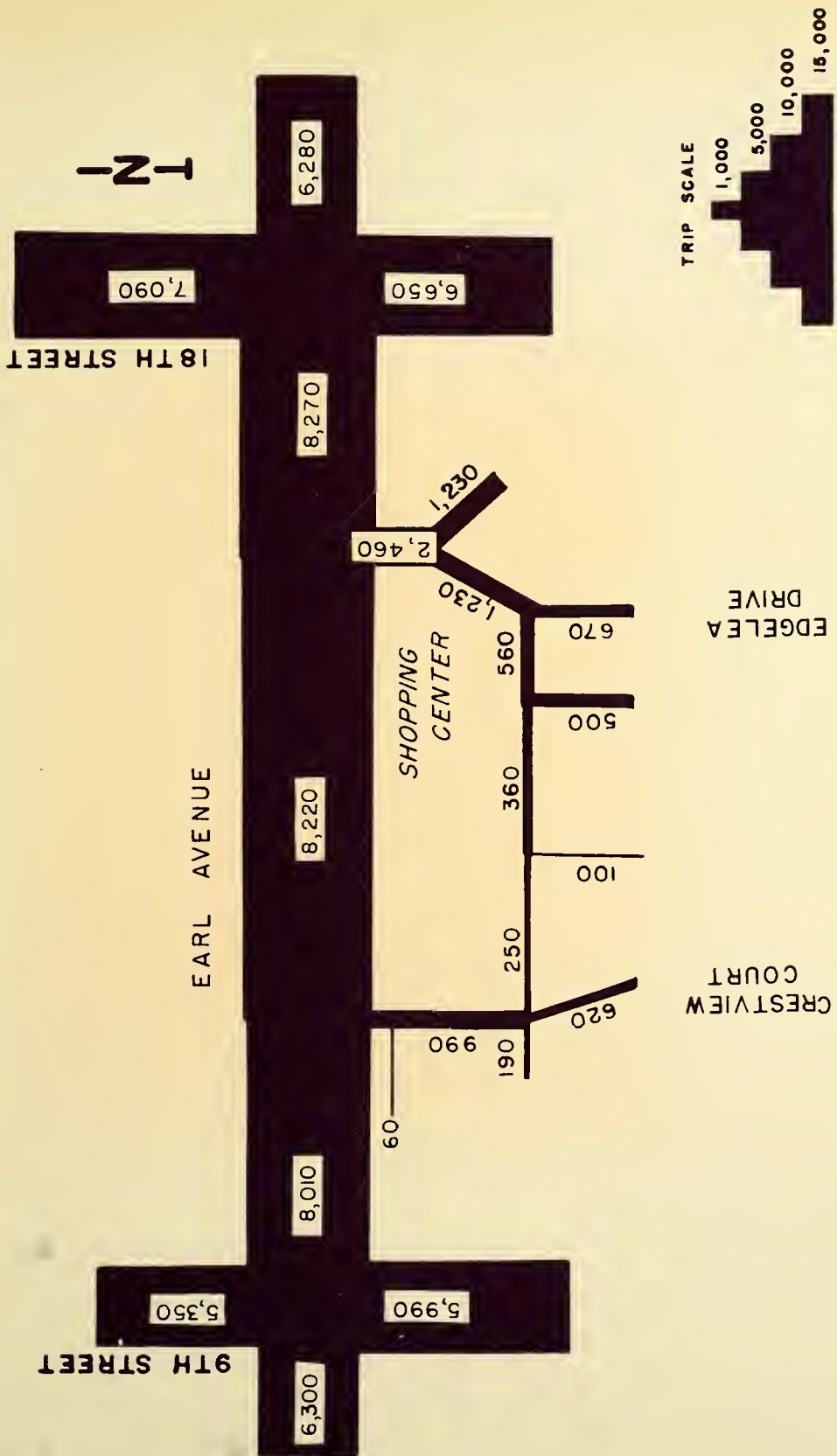


FIGURE 29 ESTIMATED 1963 AVERAGE ANNUAL DAILY TRAFFIC FLOW IN THE VICINITY OF JEFFERSON SQUARE



a traffic signal. This installation will permit much more efficient operation.

After establishing values for all traffic without the shopping center, the volumes for shopping traffic were estimated and are shown pictorially on Figure 30. This figure shows the estimated number of shopping trips to and from the shopping center within an average day during the pre-Christmas shopping season in December of 1963. The predominant direction of flow of shopper traffic is along Earl Avenue with the residential area contributing to a great extent.

From traffic counts taken in the vicinity, it was found that the afternoon peak hour occurs between 4:00 and 5:00 P.M. constituting 9 percent of the daily total. From Figure 23 the percent of shopper traffic entering and leaving during this hour was applied to the total number of shoppers visiting the center during the day. The amount of shopping trips during the peak hour together with the peak hour non-shopper traffic volumes are shown on Figure 31. The volumes are estimated for the pre-Christmas shopping period in 1963.

By 1963, it is believed that Earl Avenue will have been widened, between 9th Street and 18th Street, to 30 feet which is the width existing now along the shopping center site. With these street facilities in the vicinity, no major traffic congestion problems are anticipated to occur. Those people who desire to travel north on 9th Street and find it difficult to leave the shopping center site during the peak hour will soon find it to their advantage to leave the site along Winthrop Avenue, west to 9th Street and then north.

The proposed site plan for the Jefferson Square Shopping Center is shown in Figure 32. To eliminate the possibility that the vehicles





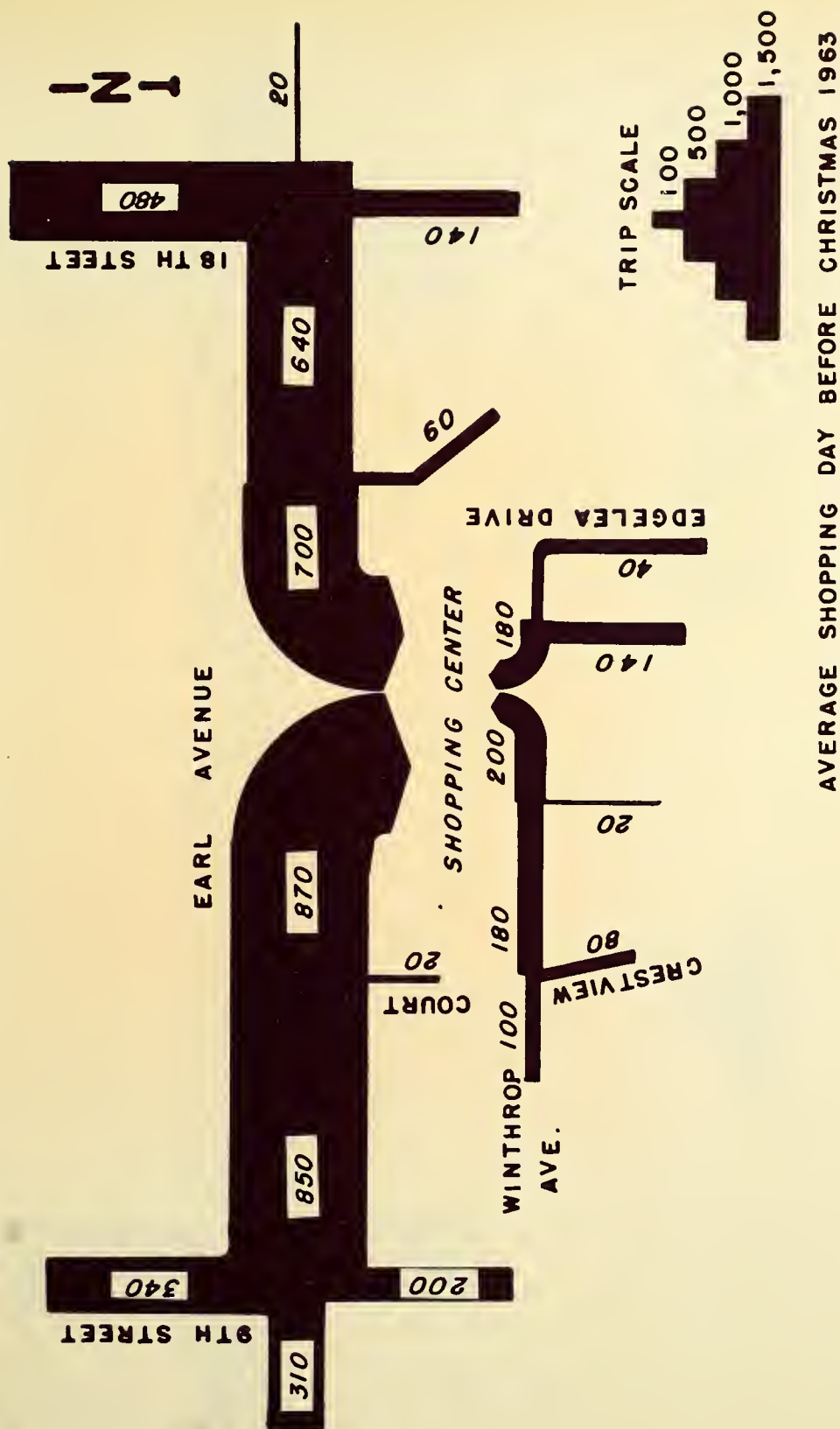


FIGURE 30 ESTIMATED VOLUME OF SHOPPER TRAFFIC  
FOR JEFFERSON SQUARE



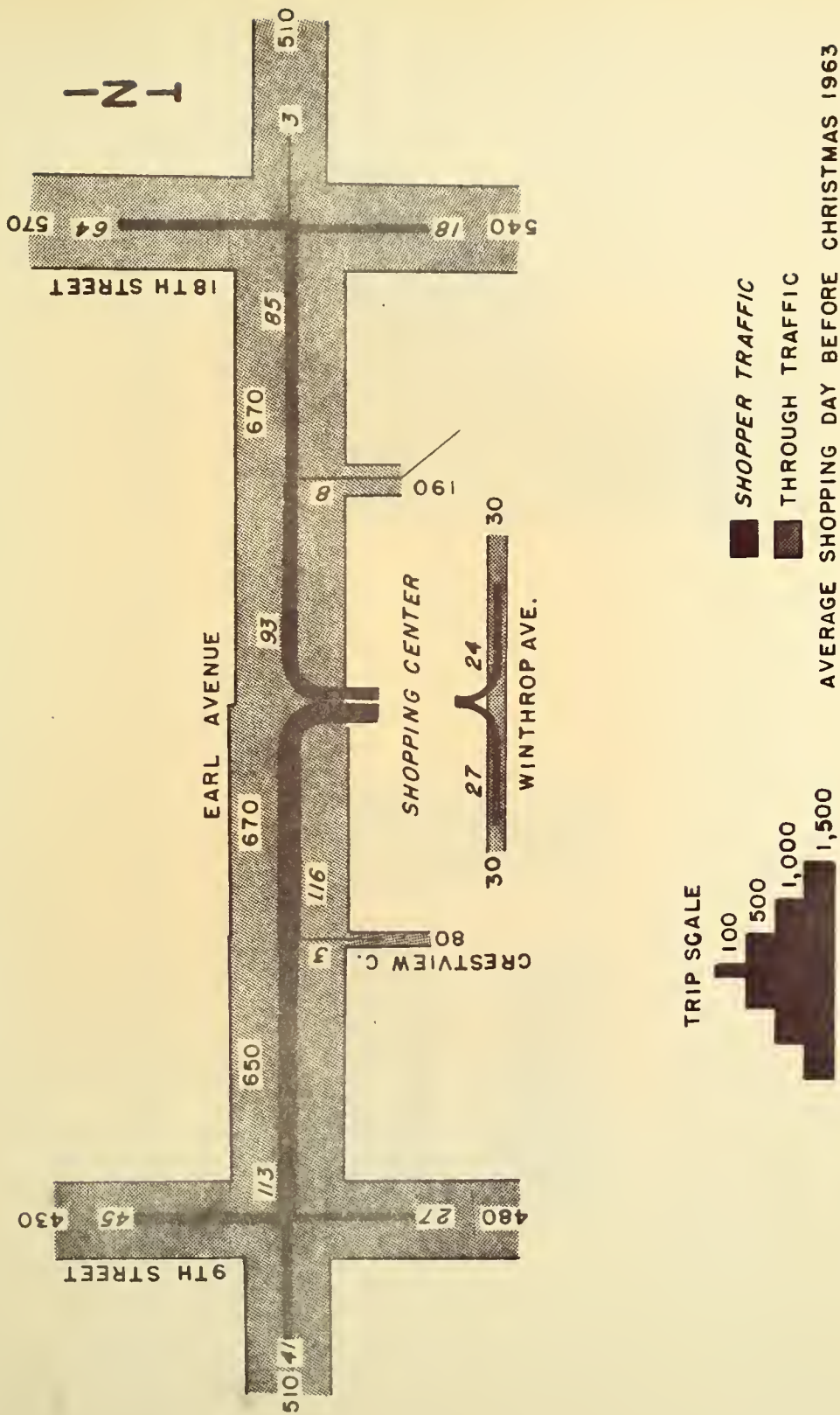


FIGURE 31 ESTIMATED DECEMBER 1963 PEAK HOUR TRAFFIC  
FLOW IN THE VICINITY OF JEFFERSON SQUARE



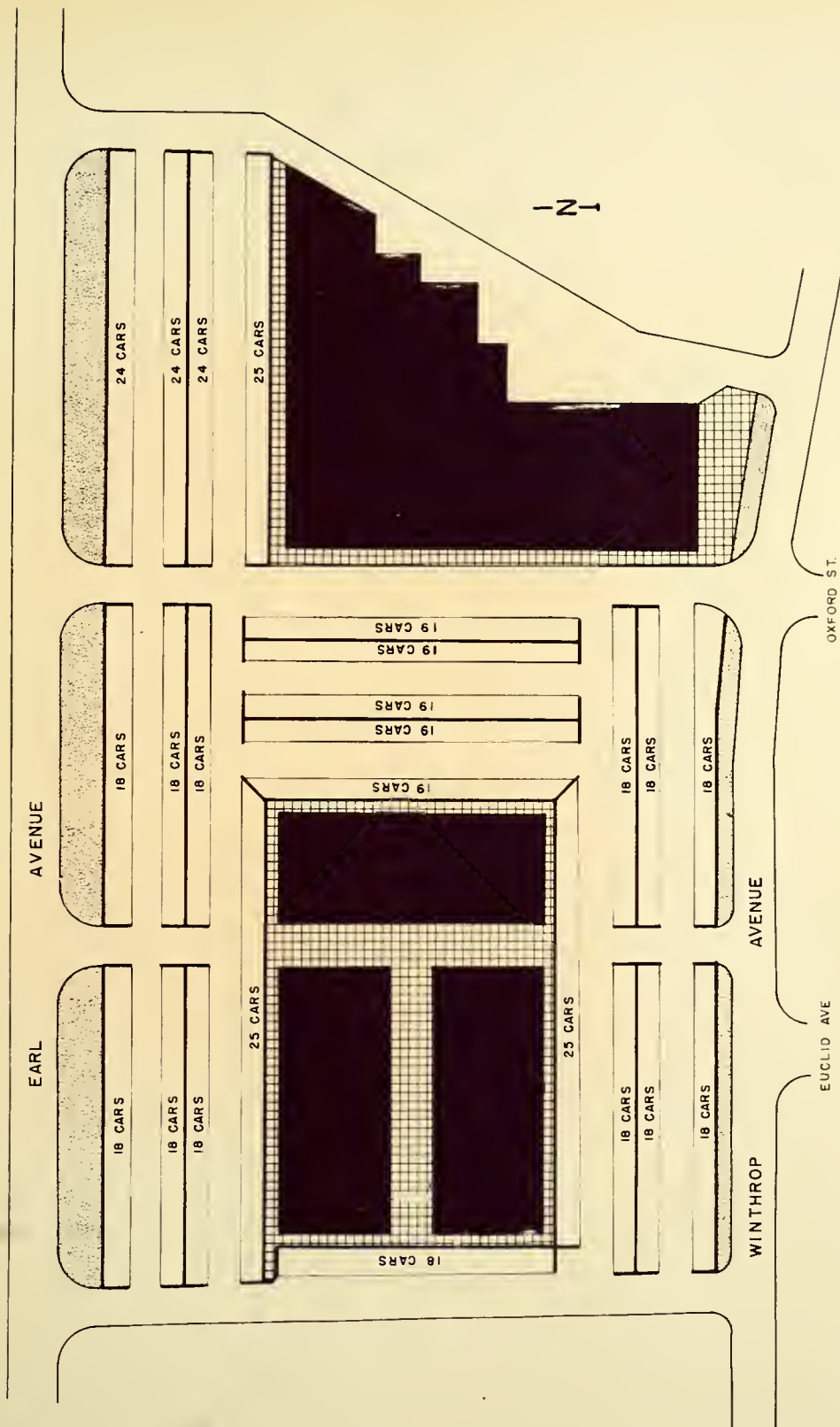


FIGURE 32 SITE PLAN FOR THE JEFFERSON SQUARE SHOPPING CENTER



traveling on Oxford Street might continue on through the shopping center to arrive at Earl Avenue, it is recommended that the entrance to the shopping center be moved to the left half way between Euclid Avenue and Oxford Street. By doing this one of the entrances to Winthrop Avenue should be eliminated. This change would also eliminate the driveway now existing between the parking area and the grocery store.

Wabash Village Shopping Center. Access to the site is excellent from all directions. U. S. Highway 52 and its Bypass serve the rural areas to the west as well as the city of West Lafayette and the northern and extreme eastern portion of Lafayette. In West Lafayette local access is excellent with County Farm Road, Salisbury Street, Happy Hollow Road, and Grant Street providing suitable routes to the site area. There will, of course, be many additional local feeder streets in the immediate trade area as residential development continues. This local pattern should be designed to provide easy and quick access to the site area by way of County Farm Road or by the southern portion of Happy Hollow Road.

Through traffic movement on County Farm Road is very light and is local in character. It is highly unlikely that County Farm Road will develop as a major highway for through traffic. However, it will become the major access route to the planned residential development north of U. S. 52 Bypass. Figure 33 shows the shopping center site together with U. S. 52 Bypass and County Farm Road.

It is believed that by 1963 the automobile ownership will have become so universal that practically all trips made for the purpose of shopping at the Wabash Village will be done by driving an automobile to the site.

Anticipated developments in the future together with the existing traffic counts serve as the basis for forecasting the future volumes of









Figure 33 The Site for Wabash Village Shopping Center



non-shopping traffic in the vicinity. Figure 34 shows the existing 1957 average annual daily traffic flow in the vicinity of the site. These volumes were obtained from the counts taken in the vicinity as discussed in the previous chapter. Assuming, then, that considerable residential expansion will take place in the vicinity and that traffic will increase at the normal expected rate, the traffic flow for the year of 1963 was estimated and is shown on Figure 35.

By the year of 1963 traffic volumes at the intersection of U. S. 52 Bypass and County Farm Road have become great enough to warrant installing a traffic actuated signal. This installation will permit much more efficient operation.

After establishing volumes for non-shopping traffic, the values for shopper traffic were estimated and are shown pictorially on Figure 36. This figure shows the estimated number of shopping trips to and from the shopping center within an average day during the pre-Christmas shopping season in December of 1963. The predominant direction of flow of shopper traffic is along County Farm Road with the bypass contributing to a great extent.

From the traffic counts taken in the vicinity, it was found that the afternoon peak hour occurs between 4:00 and 5:00 P.M. constituting 9 percent of the daily total. From Figure 23 the percent of shopper traffic entering and leaving during this hour was applied to the total number of shoppers visiting the center during the day. The amount of shopping trips during the peak hour together with the peak hour non-shopping traffic volumes are shown on Figure 37. The volumes are estimated for the pre-Christmas shopping period in 1963.

Because of heavy shopper traffic volumes on County Farm Road, it is



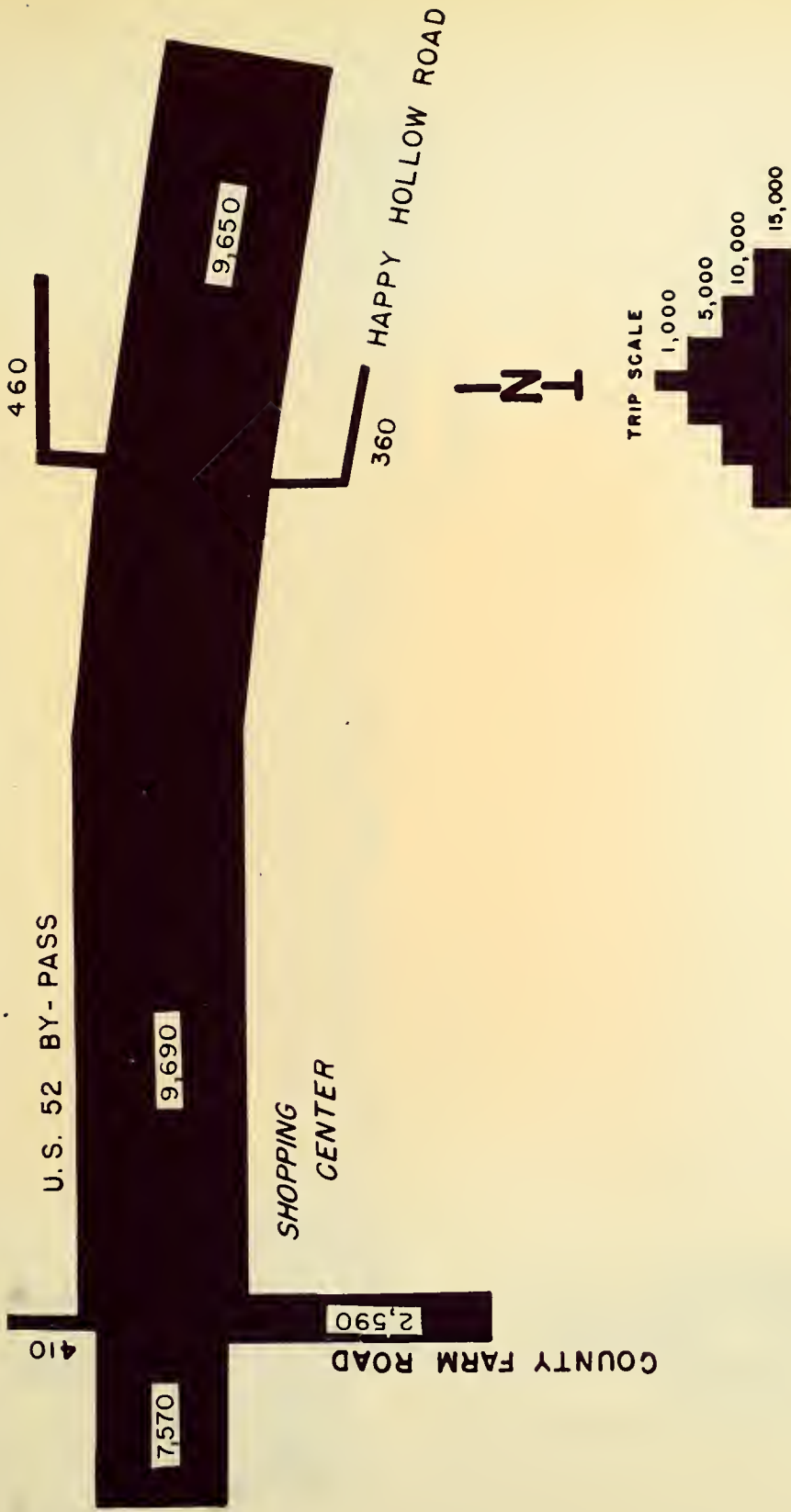


FIGURE 34 1957 AVERAGE ANNUAL DAILY TRAFFIC FLOW  
IN THE VICINITY OF WABASH VILLAGE



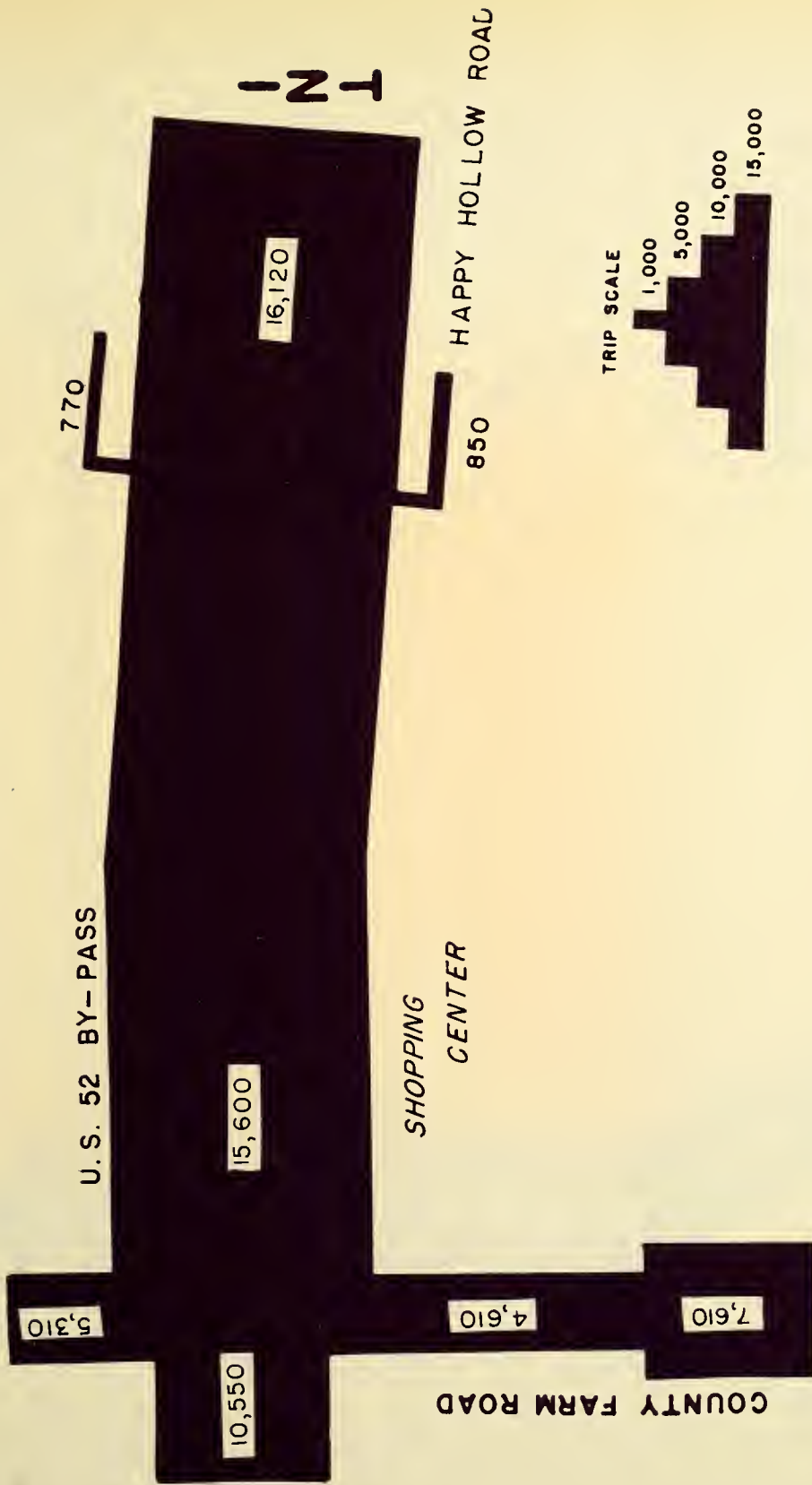
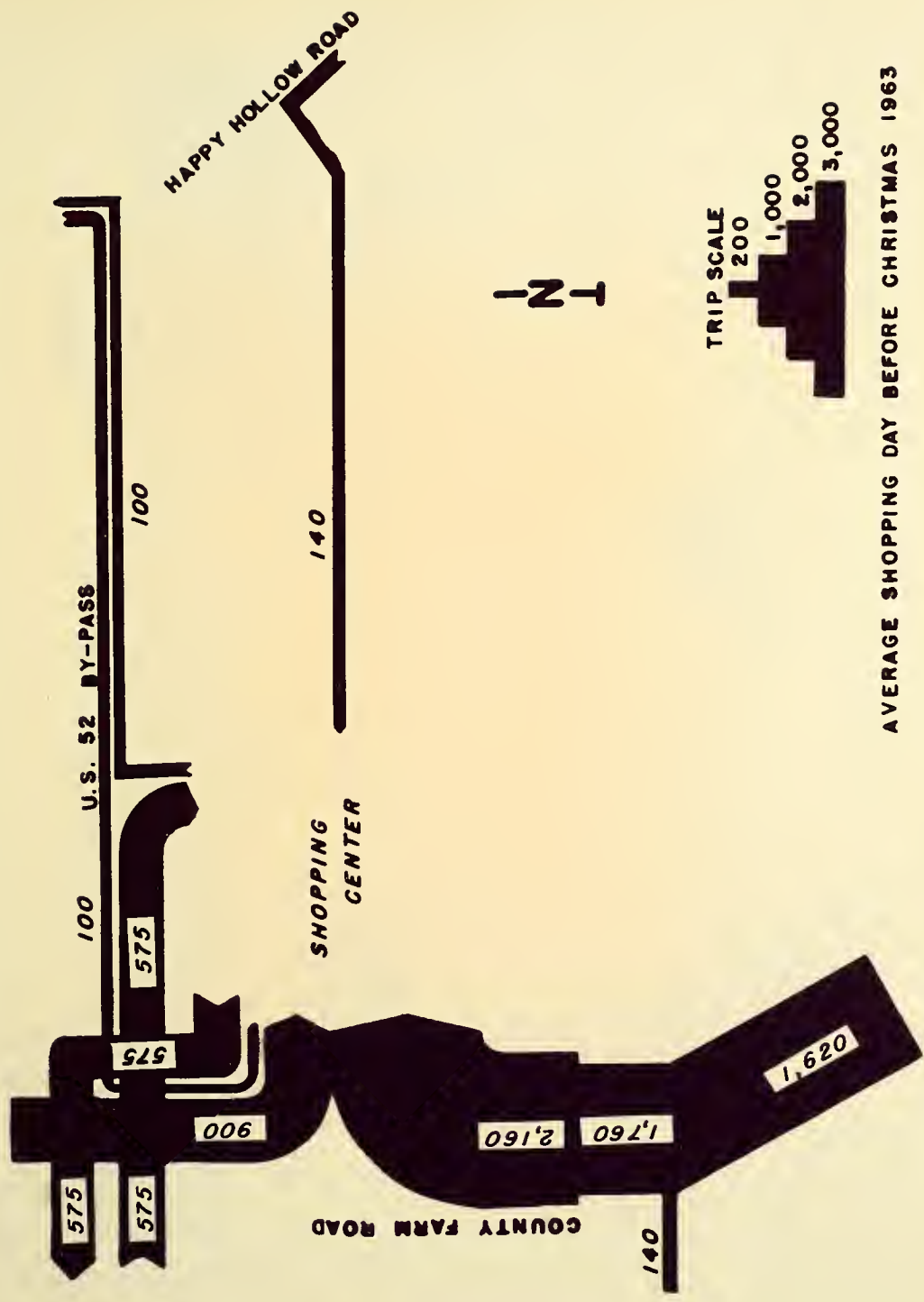


FIGURE 35 ESTIMATED 1963 AVERAGE ANNUAL DAILY TRAFFIC FLOW IN THE VICINITY OF WABASH VILLAGE



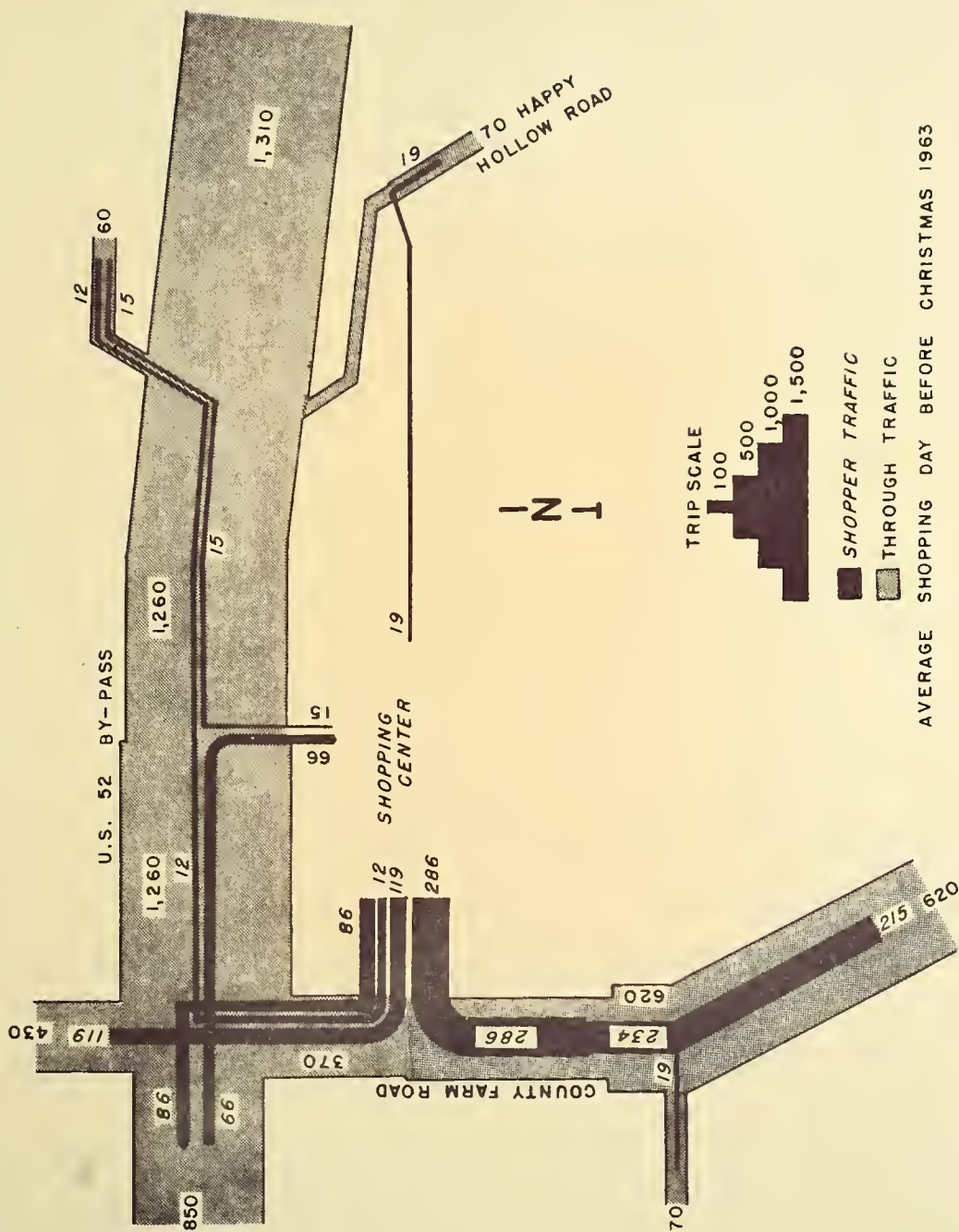




AVERAGE SHOPPING DAY BEFORE CHRISTMAS 1963

FIGURE 36 ESTIMATED VOLUME OF SHOPPER TRAFFIC FOR WABASH VILLAGE







recommended that County Farm Road be widened to accommodate two lanes of traffic in each direction with a middle fifth lane channelized for the purpose of left turns. It is also recommended that a traffic signal be installed at the entrance to the shopping center from County Farm Road. It is believed that a traffic signal will have been installed at the intersection of County Farm Road and U. S. 52 Bypass. These two traffic signals should be connected by a cable and synchronized to provide good flow of traffic through that area. The recommended design of the entrance to the shopping center from County Farm Road is shown on Figure 38.

Figure 39 shows the development plan for Wabash Village Shopping Center. This plan shows two points of access to the center from U. S. 52 Bypass. It is recommended that one of the points of access to U. S. 52 Bypass be eliminated. At the only access point off the bypass, a center-line barrier should be placed on the bypass to eliminate probable left turns off the bypass into the shopping center.

#### Future Traffic in the Levee Area

Because the levee area in West Lafayette is not recommended for a shopping center site is no indication that the tract of land should not be developed for some other purpose. Figure 40 shows the levee area with a variety store by Sears and Roebuck Company in the foreground.

To determine how this land should be used is not the scope of this study. In case this tract of land is developed to where automobile traffic plays a vital part, traffic flows in the area are presented herewith.

Figure 41 shows the 1957 existing average annual daily traffic. It is evident from this illustration that the two bridges across the Wabash River are overcrowded and a new facility is needed to relieve congestion.



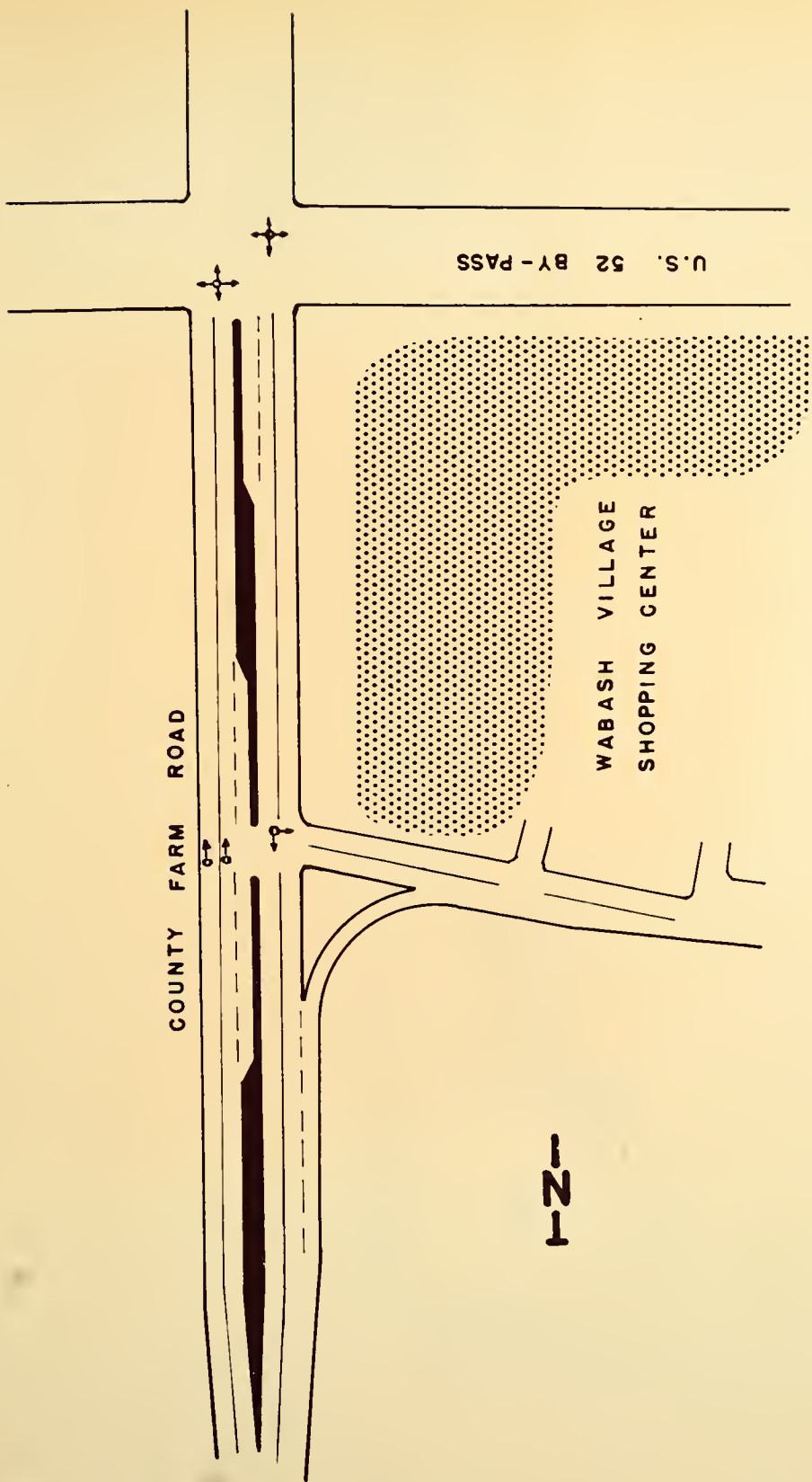


FIGURE 38 RECOMMENDED DESIGN OF ACCESS TO WABASH  
VILLAGE SHOPPING CENTER FROM COUNTY FARM ROAD





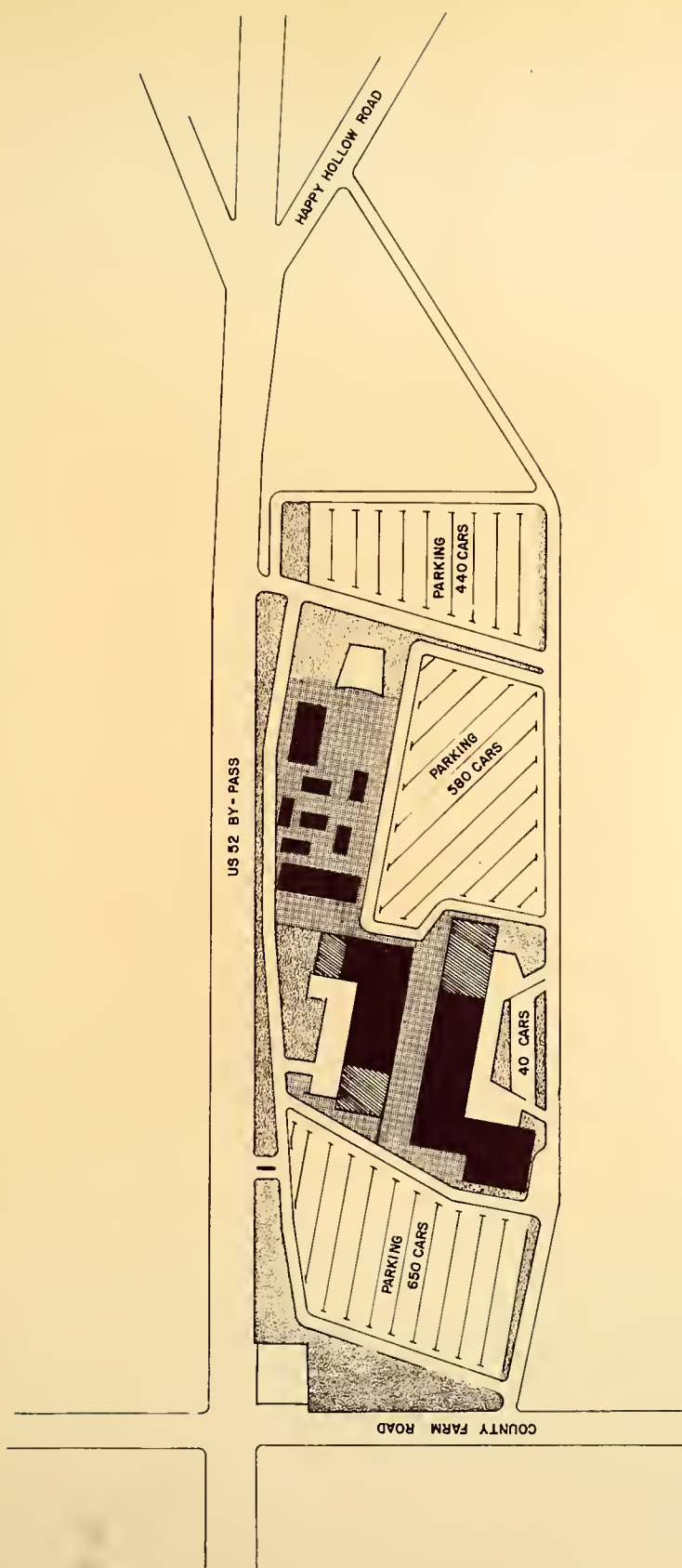


FIGURE 39 SITE PLAN FOR THE WABASH VILLAGE SHOPPING CENTER





Figure 40 The Levse Area



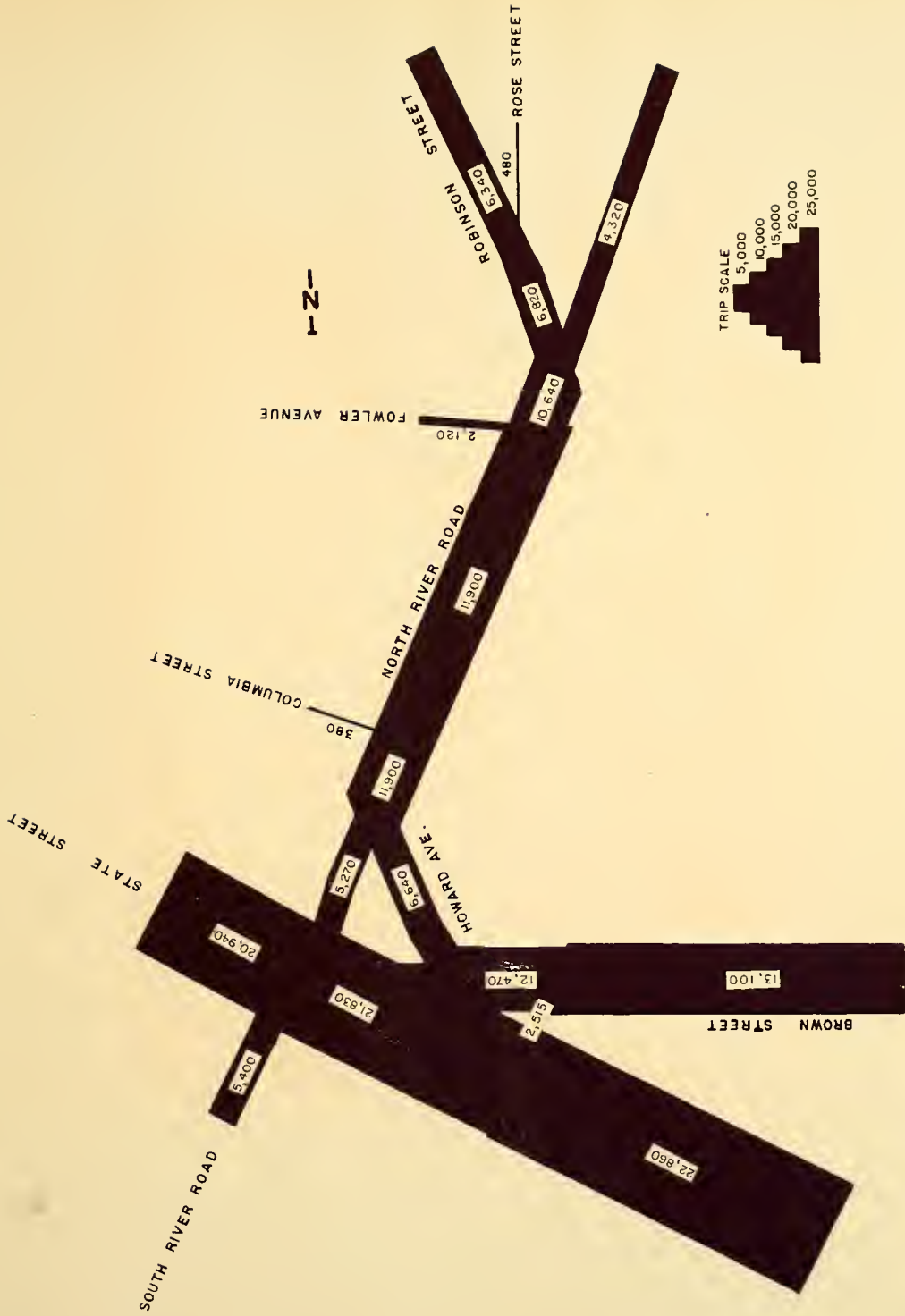


FIGURE 41 1957 AVERAGE ANNUAL DAILY TRAFFIC FLOW IN THE VICINITY OF BROWN STREET LEVEE



Anticipated developments in the future together with the existing traffic counts serve as the basis for forecasting the future volumes of traffic in the vicinity of the Brown Street levee. It is assumed that the new bridge across the Wabash River has been completed and has been in operation for quite some time. Traffic is assumed to have increased at the normal expected rate. The traffic flow for the year of 1963 was then estimated and is shown on Figure 42. Traffic volumes are shown as average annual daily traffic volumes for the year of 1963.

With the new bridge in operation, ample capacity will be provided for the shoppers on Brown Street utilizing the retailing facilities now present at this location.

Figure 42 also shows Robinson Street as a major feeder to the bridge across the Wabash River. It is estimated that this traffic will come from the rapidly developing residential area around the bypass north of West Lafayette.





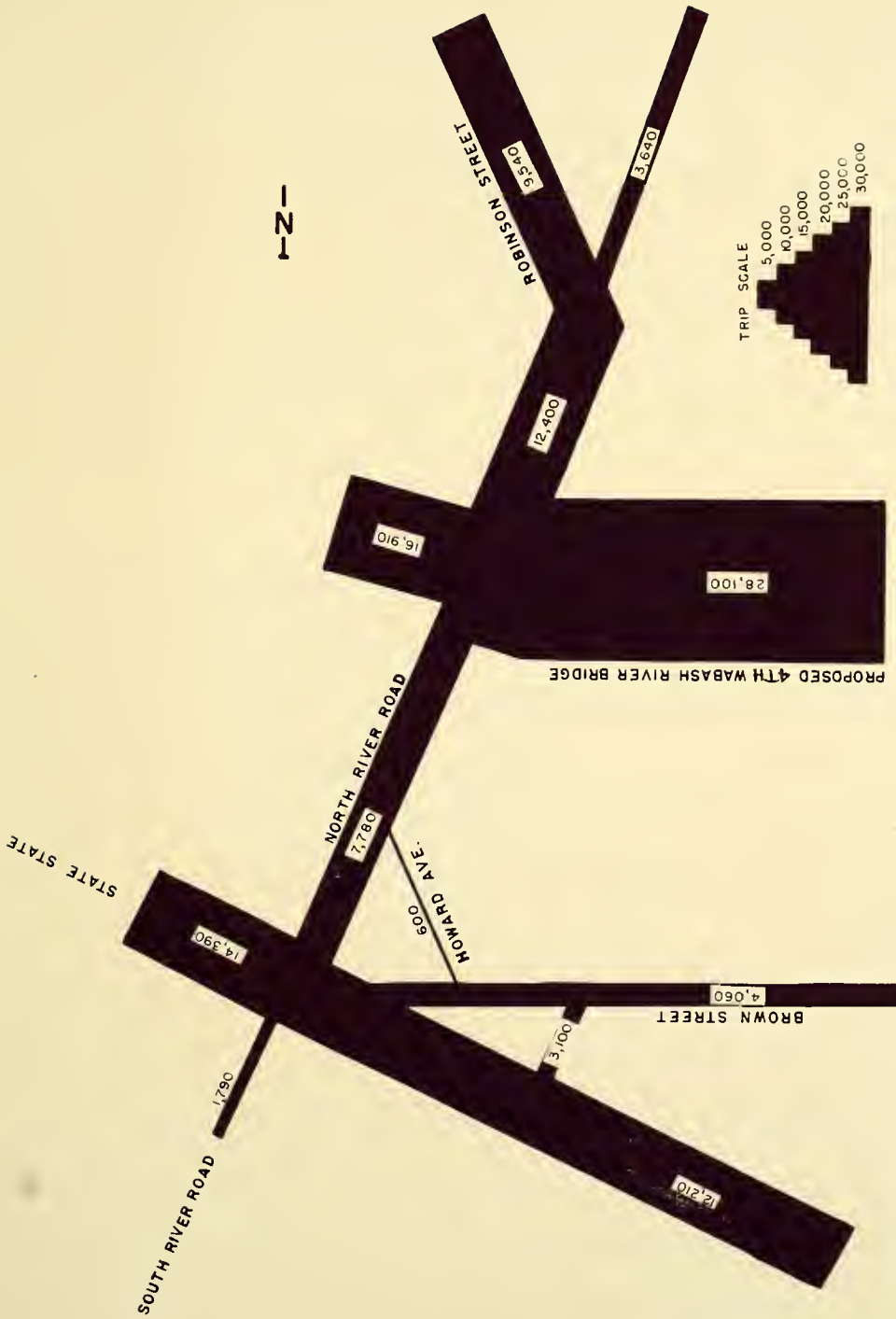


FIGURE 42 ESTIMATED 1963 AVERAGE ANNUAL DAILY TRAFFIC FLOW  
IN THE VICINITY OF THE BROWN STREET LEVEE



## ECONOMIC EVALUATION OF THE SHOPPING CENTER DEVELOPMENTS

### Description of the Developments

A great portion of the basic information in this section for Wabash Village and Jefferson Square Shopping Centers was supplied by their developers. Any information pertaining to Market Square Shopping Center has been calculatingly estimated. Table 13 presents this basic information in tabulated form.

### Employment Opportunities

On the basis of available releases of 1954 U. S. Census of Business data, plus evaluation and observed changes and trends, it appears that the total retail employment for Tippecanoe County in 1957 approximates 1720 persons including working proprietors. It is estimated that employment at the shopping centers would total at least 860 persons, exclusive of holiday season extras but including regular part time employees. The shopping centers would thus increase retail employment from the present figure of 1720 to a new total of 2580.

In Table 14 it is established that at least 500 of the 720 full time employees would want to settle permantly in the vicinity, necessitating that new living quarters be built. This group should add somewhat over \$450,000 to the earning economy of Tippecanoe County residents. It is estimated from information presented in Sales Management, "Survey of Buying Power" that the gross income of all residents of Tippecanoe County as of January 1, 1957 is \$215,000,000. The direct effect of the shopping



Table 13

## Shopping Center Developments

		Area
<hr/>		
The Site Areas		
Site Area		
Market Square	1,307,000	square feet
Jefferson Square	288,000	" "
Wabash Village	584,700	" "
	<hr/>	
	2,179,700	square feet
Building Area		
Market Square	162,000	square feet
Jefferson Square	88,700	" "
Wabash Village	118,000	" "
	<hr/>	
	368,700	square feet
Parking Area		
Market Square	720,000	square feet
Jefferson Square	199,300	" "
Wabash Village	466,000	" "
	<hr/>	
	1,386,000	square feet
Estimated Construction Costs		
Market Square	\$3,000,000	
Jefferson Square	1,368,000	
Wabash Village	2,021,700	
	<hr/>	
	\$6,389,700	
Estimated 1963 Sales Volume		
Shopping Goods		
Market Square	\$4,877,500	
Jefferson Square	702,000	
Wabash Village	1,915,000	
	<hr/>	
	\$ 7,494,500	
Convenience Goods		
Market Square	\$4,180,000	
Jefferson Square	2,425,000	
Wabash Village	5,240,000	
	<hr/>	
	\$11,845,000	



Table 13 (Continued)

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Services and Facilities to be Provided by the Shopping Centers:

Connections to existing sanitary sewers.

Provisions for discharge of storm water into storm sewers

Fire alarm system (if required by underwriters)

Contract garbage disposal

Water extensions to the sites

Maintenance of roadways and parking areas on site, and of  
access roads through abutting property.

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centers on total resident income would therefore be to cause an increase of approximately 1/4 of a percent.

#### Housing Demand and Character

Referring to Table 14, it is shown that the demand for employee housing would add \$1,500,000 to the assessed value of the county assuming representative figures of 500 houses assessed at \$3,000 each.

If these shopping centers are built in Tippecanoe County, it is logical to expect that the advantage of nearness to a complete group of shops, with no traffic congestion, would influence many families to select Tippecanoe County for their future home rather than choosing some other county. It is assumed that there would be 150 of these new families over and above normal anticipated population growth of the county. They would form part of the upper middle and higher income groups, and could be anticipated to build homes averaging in the \$30,000 price class.

The 8 year (1957-1965) housing demand to be expected from each of its three principal sources may be tabulated as follows:

Normal population growth	4,100 new homes
Shopping center employees	500 new homes
Other new residences attracted by the centers	<u>150 new homes</u>
Total	4,750 new homes

It should be observed that 86 percent of this anticipated growth is normal expectation, and only 14 percent would be induced by the shopping centers.

#### Shopping Centers Assessments

The building residual technique is used for the appraisal of the



Table 14

## Shopping Centers Employment and Housing Demand by Employees

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Total Employment at Shopping Centers	860
Full time (40 hours per week)	720
Regular part time (20 hours per week)	140
Additional seasonal peak employment	Not Considered
Proportion of Full Time Employees Assumed to Desire to Live in Tippecanoe County	90 percent
Number of full time employees assumed to desire to live in Tippecanoe County	650
Number presumed to live in furnished rooms	100
	<hr/>
Balance needing houses or apartments	550
Assumed vacant houses and apartments available	50
Estimated required number of new houses of apartments	500
	<hr/>
Average sale price of new houses	\$15,000
Average assessed value	\$ 3,000
Increment of assessed value for 500 houses	\$1,500,000

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shopping centers and is based on actual square foot cost of the land.

	<u>Market Square</u>	<u>Jefferson Square</u>	<u>Wabash Village</u>
Cost of land - \$ 0.115 per sq. foot	\$150,000	\$ 33,100	\$ 67,200
Net income of property before depreciation estimated at 14 percent of gross income	127,000	43,800	100,000
Future interest on land value at 7 percent	10,500	2,300	4,700
Net income imputable to value of improvements	<u>\$116,500</u>	<u>\$ 41,500</u>	<u>\$ 95,600</u>

Valuation:

Future interest and depreciation rates on improvements

Interest 7 percent

Depreciation 2.5 percent

Capitalization Rate 9.5 percent

Improvements value at 9.5 percent	1,225,000	437,000	1,007,000
Land Value at cost (above)	150,000	33,100	67,200
Total Value of Property	<u>\$1,375,000</u>	<u>\$470,100</u>	<u>\$1,074,200</u>

Effect on Traffic Flow

For the purpose of determining the effect of a shopping center on traffic flow it is especially important to note that movement into and out of a shopping center varies widely from day to day and hour to hour. The days of the week producing the greatest movement normally are Monday and Friday, presuming that stores stay open in the evening on these days. So far as hourly movements are concerned there is an outbound peak from 5:00 to 6:00 P.M. on the days when stores close at 5:30 P.M. This hour



is also the peak hour for the commuter traffic at the vicinity of Market Square. As a consequence the peak movement from Market Square is counter to the direction of the commuter movement. Because the shopping centers will open after the peak morning traffic hour has concluded, the existence of the centers will have little if any, effect on the rush hour movements.

### Effect on Neighboring Property Values

The shopping centers and the traffic they create are not considered to produce any adverse effects, due to proximity, on the residential developments in existence and in proposed stages situated in the vicinity of the others. The noise of the normal arterial highway traffic, and the noise of the railroad trains are far greater deleterious influences on property values than the nearness of the shopping centers.

The value of property near all three shopping centers is estimated to increase. But some home owners regard a shopping center as a possible deteriorating factor in residential values. Where a center is built with a buffer strip of green planting between it and nearby residences, any adverse aesthetic effects are minimized. Proximity to a shopping center is frequently used for residential sales promotion.

Recorded real estate transactions adjacent to shopping centers show that property values have risen. Whether all the rise can be accredited to the shopping center or whether some of it at least has been due to inflation or to abnormal housing demand, has been impossible to determine.

One additional effect of the shopping centers on nearby properties remains to be mentioned. Residential tax delinquent lots foreclosed in the fringe area by the metropolitan area have greater saleability and bring a better price because of the shopping centers.





### Effect on Business Districts

There are indications that the stimulus of competition, and the evident advantages to be gained from catering to the new business generated by shopping centers, may well produce increases in many kinds of retail trade and services in nearby business districts.

### Effect on Municipal Finances

In this section all figures have been derived by considering the shopping centers, and the new residential construction resulting directly from it, to be the only two elements causing changes in assessed valuations.

The shopping centers intend to provide all the physical facilities and immediate access to the centers without cost to the community. The construction of centers will therefore add very few items to the annual budget and tax levy of Lafayette-West Lafayette. These items are listed, with appropriate established amounts, in the upper part of Table 15. The bottom of this table shows the effect on total taxes receivable. There would be an estimated annual net decrease of \$113,800 in taxes that would need to be levied on existing business and residential properties in order to supply the present level of municipal services.

The figures in Table 15 represent a combination of maximum adverse conditions. With slight modifications on various scores, the findings would be even more favorable.

It is concluded that the shopping centers, Market Square, Jefferson Square, and Wabash Village in Metropolitan Lafayette are viewed as having, in the long run, no consequential adverse effect on the community.



Table 15

Estimates of Annual Added Governmental Costs Due to the Shopping  
Centers and to the Resulting Residential Construction

Item	Amount
Road maintenance due to added traffic	\$ 5,000
Fire, protection to shopping centers	\$ 6,000
Police, 4 additional patrolmen	\$ 14,000
	<hr/> \$ 25,000
Widening and channalizing Greenbush Street	\$ 10,000
Installation of fixed time traffic signal at the intersection of Greenbush Street with Elmwood Avenue	\$ 3,000
Widening of Elmwood Avenue to 40 feet	\$ 15,000
Channalization at the entrance to Wabash Village on County Farm Road	\$ 2,000
Signals, semiactuated, at the entrance to Wabash Village on County Farm Road	\$ 6,000
Total initial investment	<hr/> \$ 36,000
Over ten year period	\$ 3,600 per year
General government, for 650 new families and their homes, built as result of shopping centers. Increase results from governmental services to a large population	\$ 57,500
Unforeseen expenses	\$ 30,000
Expenses due to an increase in school enrollment	\$ 106,000
Total added governmental costs	<hr/> \$ 222,000



Table 15 (Continued)

Item	Amount
<hr/>	
Estimated tax paid by shopping centers	
	<u>Appraised Value</u>
	<u>Total Tax</u>
Market Square	\$1,375,000
Jefferson Square	470,100
Wabash Village	215,000
Total	<u>73,500</u>
	\$209,600
Estimated taxes paid by new homes	\$ 126,800
Total new taxes receivable	\$ 336,400
Reduction in taxes on property	\$ 113,800
<hr/>	



## CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and recommendations were drawn from this study.

### Conclusions

1. The trade area of the Greater Lafayette community can effectively support the existence of at least three of the proposed shopping centers.
2. The existence of the proposed shopping centers will have little effect on the rush hour traffic in Greater Lafayette.
3. Greenbush Street in the vicinity of the Market Square Shopping Center will need widening and channelization to handle the traffic generated by that Center.
4. Elmwood Street in the vicinity of the Market Square Shopping Center will require an additional lane to provide for left turns in that Center.
5. The increase in traffic through the intersection of Elmwood Avenue and Greenbush Street will be sufficient to warrant traffic signals after the opening of the shopping center in that area.
6. The proposed street layout in the Jefferson Square Shopping Center will permit through traffic on Oxford Street to travel through the parking area of this center.
7. The increase in traffic volumes on County Farm Road will necessitate a road accomodating two-lanes of traffic in each direction and a fifth channelized lane for left turning movements into that Shopping Center.





8. A detailed study and long-range plan for traffic movement is necessary to eliminate the traffic congestion that is now present and that will increase with additional construction in the Brown - Main Street Levee area of West Lafayette,

9. The proposed shopping centers and the traffic they create will not produce any major adverse effects, due to proximity, on the residential developments in existence and in proposed stages situated in the vicinity of the shopping centers.

10. The proposed shopping centers will bring many benefits to the citizens of Greater Lafayette, including additional employment, additional valuation, and better service to the trade area.

#### Recommendations

1. To relieve traffic congestion it is recommended that Greenbush Street be widened along the entrance to the Market Square Shopping Center and channelization provided to allow free movement of vehicles.

2. It is recommended that Elmwood Avenue along the Market Square Shopping Center site be widened to a minimum of 44 feet to allow one lane of free movement in each direction while the inside lane is being used by vehicles attempting left turns into the shopping center.

3. Shopper traffic amounts to 35 percent of total traffic through the intersection of Elmwood Avenue and Greenbush Street during the peak hour. Because of high traffic volumes at this intersection, it is recommended that the existing stop signs be eliminated and replaced with traffic signals.



4. To eliminate the possibility that vehicles traveling north on Oxford Street might continue on through the Jefferson Square Shopping Center site to arrive on Earl Avenue, it is recommended that the proposed entrance to the shopping center at this point be moved to a point half way between Euclid Avenue and Oxford Street.

5. Because of heavy shopper traffic volumes on County Farm Road, it is recommended that it be widened to accomodate two lanes of traffic in each direction with a middle fifth lane channelized for the purpose of left turns into the Wabash Village Shopping Center.

6. It is recommended that a detailed study be made and a long-range plan be prepared of traffic movement in the Brown - Main Street commercial district of West Lafayette.



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